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A FURTHER STUDY OF PREHISTORIC SMALL HOUSE RUINS IN THE SAN JUAN WATERSHED

BY

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A FURTHER STUDY OF PREHISTORIC SMALL HOUSE RUINS IN THE SAN JUAN WATERSHED

By T. MITCHELL PRUDDEN

IN an earlier paper on the "Prehistoric Ruins of the San Juan Watershed,"[1] it was noted by the writer that among the several types of ruins widely scattered over this extensive area, the most abundant and uniform in character is the small pueblo, standing in the open country; now usually reduced to a jumbled heap of roughly trimmed, much-weathered stones—the "Mounds" of the regional vernacular—and mostly grass or sage grown. With this small house ruin are almost invariably associated the site of a circular ceremonial chamber and a burial mound, both as a rule lying to the southward of the pueblo. This habitation complex was called the "Unit Type" for reasons set forth, together with a description of its details and variants, in the paper just referred to and in a subsequent study.[2] The abundance and apparent uniformity of this type of small open country ruin, and its topographic and cultural relation to other and more complex examples of prehistoric ruins in this region, both in the open and in various forms of cliff shelters; as well as its interest as an obvious expression of family, clan, or other social relationships among these primitive house-building people, led the writer to undertake to secure, through such excavations and other studies as were practicable, as precise a conception as might be of the life and culture of these early folk who made the little ranch houses in the open country. For the question of the relationship of these people to those who also in this district made the more complex, picturesque, and often stately communal dwellings, is one whose solution would seem to

[1] "The Prehistoric Ruins of the San Juan Watershed, etc.," *American Anthropologist* (N. S.), vol. 5. (April–June, 1903). Pp. 224–228.

[2] "The Circular Kivas of Small Ruins in the San Juan Watershed." *Ibid.*, vol. 16. (Jan.–March, 1914). Pp. 33–58.

depend upon a detailed independent study of each type of architecture and of such associated artifacts, belongings, and conditions of life of each group as may have survived the vicissitudes of time and exposure.

The first year of this special study—1913—was directed particularly to the underground kivas, which in the four ruins then examined were found to exist under the shallow depressed area close at the southern side of the pueblos; partly filled by the wreckage of their own roofs and walls and of the front walls of their adjacent houses, and buried by the sand drift.

These underground, circular, stone-walled and pilastered chambers all resembled kivas already known in some of the larger ruins of this district, in their recesses and pilasters, while those completely exposed showed a ventilator shaft, a deflector, a fire pit, and a door and underground passage leading upward from the kiva into the adjacent pueblo. The various bone and stone implements discovered were of the forms common in the larger and smaller ruins of other types in this district, while the pottery conformed to the type outlined by Fewkes as characteristic of the San Juan area.[1] Details and illustrations of this study may be found in the paper referred to.[2]

As it seemed desirable to gather additional data over a still wider range, further field studies were made in the summer of 1915 which it is the purpose of this paper briefly to record.[3] Three more ruins of the unit type were examined, lying many miles apart but all in sagebrush openings upon the great piñon, juniper, and sage clad, canyon-scored mesa, which on the borders of Colorado and Utah, slopes upward toward the McElmo canyon and Ute mountain.

There are many ruins, large and small, upon this rugged upland, from the vicinity of Cortez and Dolores westward to the great mesa tongues which fall away toward the San Juan river from the foot of

[1] Fewkes, "Antiquities of the Mesa Verde National Park Spruce Tree House," *Bulletin 41. Bureau of American Ethnology* (1909), p. 35.

[2] *American Anthropologist* (N. S.), vol. 16 (Jan.–March, 1914).

[3] I was fortunate this season, as in so many previous summers of field study, in having the cooperation of Clayton Wetherill, to whose knowledge of the country and energy and skill in search and excavation I am greatly indebted.

the Blue mountain (Sierra Abajo). With the exception of the Goodman point ruin, these are little known save to the cattlemen, to whom their significance lies largely in the probability of some accessible water source near by. In the canyon bottoms of the larger stream courses, which, cutting deep across this uplift, carry the Blue mountain water to the San Juan—namely Montezuma Recapture and Cottonwood creeks, and the Butler and Comb washes —there are also many small ruins of the unit type. Of the several hundreds of these known to the writer from his earlier reconnaissance survey of this northern San Juan district, it seemed that the most instructive, in completing the picture of the builder of these simple homesteads in the open country, might be those which had given the impression of relatively great age. This is especially the case with many of the small ruins among the piñons on this great plateau. For many of them show excessive weathering and disintegration of such of the pueblo building stones as are exposed above the sand drift, by which and the sage, in their state of surface denudation, they are often largely covered and sometimes almost completely concealed. Fragments of standing wall are seldom if ever visible, while here, as elsewhere, the kivas are almost completely filled with wall and roof wreckage and sand drift. The writer has now in mind relative, not absolute, age, and is not unmindful of the fallacies to which in either problem one may yield, if he be not discreet in judging of age in these prehistoric structures without due allowance for rapid changes in appearance, which may be wrought by erosion and the sweep and fill of the sand drift and the action of the rain and the frost in these lofty open regions. But since some of the ruins of our type already examined had shown better surface preservation than many of those in other regions, it seemed wise to go well afield and include both forms in the attempt to determine the characters of the type, without immediate regard to the question of either relative or absolute age as indicated by the state of physical disintegration.

The results of this further series of excavations in their larger features are practically identical with those of the earlier series, and would seem to establish the uniformity of structural type in the

dwellings which these ruins denote, and the identity of the culture of their makers over a wide area in the northern San Juan country.

But in order to record the data from which a proper summary can be framed, it will be necessary, in spite of repetitions, to recount briefly the details of each of these excavations of the present series.

Finally the attempt will be made to summarize the structural characteristics of the ruins of this type on the basis of the combined field studies and to make such a sketch of the life and culture of this primitive housebuilder as the various observations may seem to justify.

Owing to the striking uniformity disclosed in orientation and construction, we have found that we can most economically lay out the plan for excavation in these ruins, by first determining the exterior lines of the back and end walls of the pueblo. This in most instances may be readily done by starting at the outer edge of the stones in the northern throw of the fallen walls, and working inward at a right angle to the long axis of the mound. Thus usually one soon comes upon the remnant of the north wall in place, which may be followed to and along the ends of the house. With the length of the pueblo and the direction of its long axis thus established, one can start a trench across the kiva pit at a right angle to the pueblo at its middle segment, with a reasonable assurance that a trench 4 feet wide will include the ventilator opening and shaft, the deep southern recess; the fire pit and deflector; the northern recess and the door from it to the passage into the pueblo from the kiva; the passage itself and the manhole in the floor of the front room. Such a trench will probably include also, if they are present, the *sipapu* and one of the niches in the northern wall of the kiva. This plan of operation is of value in the economy of labor, because the exact situation of the pueblo is not usually evident in the undisturbed stone heap, and the center of the kiva depression (so-called "kiva-pit") on the surface is not apt to correspond very closely to the center of the buried kiva itself. The excavation, especially of the deeper parts of the kivas, is frequently a toilsome process, since toward the bottom the building stones and the adobe soil and drift are apt to be cemented into a solid mass, requiring the constant use of the pick and trowel. The determination of the floor level of these kivas in the hard mass is not always easy, and we have found that by a generous wetting of the deeper layers, as the bottom is approached, the last two or three inches of filling often peels off from the floor with ease, and with much greater safety to artifacts lying upon the floor, than is secured by even the most careful manipulation of the pick and trowel and brush in the hard dry material.

Ruin No. V

The first ruin here to be described, which in the entire series may be called Ruin no. v is on the Cohon mesa in western Colorado, and lies about three quarters of a mile eastward of Ruin no. iv of 1913.[1]

It is about one quarter of a mile west-southwest of the point at which the trail crossing the Cohon mesa from the Picket corral at the edge of Ruin canyon [2] goes over the rim of the Hovenweep canyon to Risley's spring at the bottom. I estimate from the location of his nearest monument, kindly furnished to me by Prof. R. C. Coffin, that this ruin is approximately 16½ miles northwest of Ute mountain. It is in a sage-grown opening in the piñons and junipers, about 50 yards across. There are many ruins of our type widely scattered on the Cohon mesa, as well as numerous larger and more complex forms along the edge of Ruin canyon, which itself shelters interesting cliff houses.

This ruin, no. v, was selected, first, because I wished to determine more fully than was practicable by the partial excavation of no. iv in 1913, the details of structure in the Cohon group; and second, because it presented the simplest form of a compact isolated house which it seemed interesting to compare with some of the units set in rows which were in the season's prospect further west.

There are several small ruins of the same general character as this no. v within the radius of a mile on this segment of the Cohon mesa, the nearest about 250 yards southwest. Water is accessible to them in a small spring under the rim rock of Ruin canyon to the west, while to the east is the more abundant Risley's spring, at the bottom of a small offset of the Hovenweep.

The preliminary inspection of no. v reveals a densely sage-grown stone heap about 40 feet long and 20 feet wide whose top rises about 2½ feet above the general surface hereabouts, its long axis running east and west. The kiva site, close to the south, is

[1] *Loc. cit.*, *American Anthropologist*, vol. 16 (Jan.–March 1914), p. 56.

[2] There is another "Ruin canyon," a few miles southward, one of the tributaries of the Yellow Jacket, and containing well-preserved houses and towers, to which visitors were frequently conducted in the early days by the Wetherills by way of the McElmo canyon and the mouth of the Yellow Jacket.

depressed at its center about 15 inches. The whole area of depression is about 25 feet in diameter.

The nearest edge of the burial mound is about 60 feet southeasterly from the center of the kiva pit; it is slightly raised above the general level; its soil is darker in color than the surrounding natural earth and it has been completely despoiled by pot-hunters.

On the northerly side of the ruin, and about 60 feet away, is a semicircular mound of earth about 50 feet long, now about 2 feet above the general level along its axis, and about 5 feet wide at its base, and extending on either side beyond the ends of the pueblo. The space between this earth mound and the pueblo, open at the ends, is crossed by three radially placed incomplete rows of large trimmed stones laid in a single tier, dividing it into segments. Such lines of stones radiating from the pueblo, with and without the partially enclosing mound of earth at its back, are to be seen in some of the other ruins of this type on the Cohon mesa.

The Pueblo.—The pueblo proved to be about 30 feet long and 16 feet wide externally, and consisted of two rows of rooms, three rooms in each row; the rooms being of unequal size and shape (see figure 1).

The front wall stood about 8 feet north of the inner circle of the kiva. The yet standing walls of the house were from 10 to 12 inches thick, laid up of roughly trimmed sandstone of the region. The surface of some of the building stones was fairly smooth, while others were deeply indented with pit-like or linear marks of trimming utensils. We completely cleared only the middle room of the south row, revealing, close to its front wall, the manhole to the kiva passageway.

The center longitudinal wall was standing about 30 inches high. The others were more thrown down, but with the lower tiers in place. Only in the center of the front wall of the middle room the entire structure had slumped, together with the wall of the south segment of the manhole, into what proved to be the collapsed tunnel to the kiva. The manhole to this tunnel (see ground plan, figure 1) about 24 inches in transverse diameter, was edged on its northern intact segment, with flat stones forming the surface of the floor

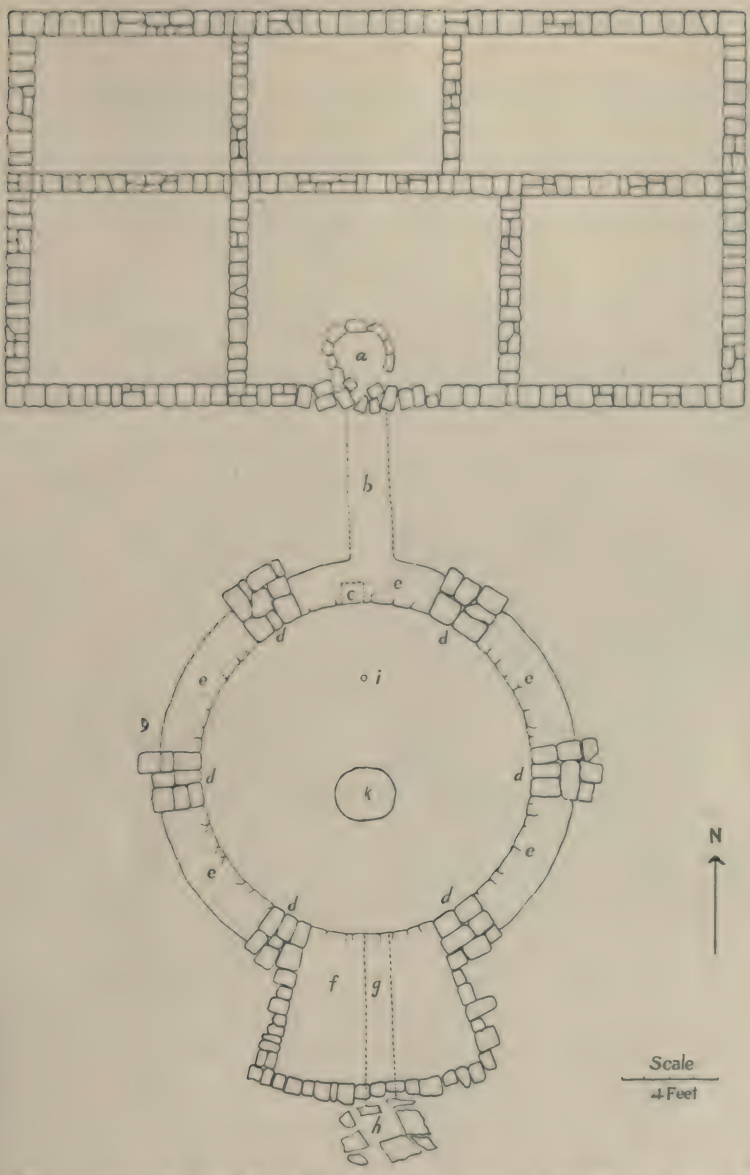


FIG. 1.—Ground plan of Ruin no. V. on Cohon mesa. *a*, Manhole into tunnel to kiva. *b*, Underground tunnel from front room of pueblo to kiva. *c*, Cubby-hole or niche in north wall of kiva beneath banquette. *d*, Pilasters for the support of the roof timbers. *e*, Recesses between the pilasters with banquettes about 33 inches above the level of the kiva floor. *f*, Deep southern recess and banquette. *g*, Horizontal portion of the ventilator flue, opening within at the floor level. *h*, Perpendicular shaft of the ventilator with the opening at the ground level outside the kiva wall and protected by flat stones now displaced. *i*, *Sipapu* in floor of kiva. *k*, Fire pit in floor.

hereabouts, while below, the gradually widening, and here nearly perpendicular passage was lined with thicker rough-edged flat stones, well set. The floor of this center front room was in part plastered, in part surfaced with packed earth, and lay as did those of the other rooms, about 10 to 12 inches above the level of the general surface of the ground about the pueblo.

FIG. 2.—Northerly segment of kiva, Ruin no. V. This shows two pilasters; the opening of the vaulted tunnel through the ground to the floor of the front room of the pueblo which starts at the level of the northern banquette; the cubby-hole in the wall of the kiva below the banquette; the *sipapu* in the floor between the fire-pit and the north wall.

The Kiva.—(Figures 1 and 2.) The excavation of the kiva revealed such structural features as I have previously found in this type of ruin. The diameter of the inner circle was about 13½ feet. The banquettes averaged about 53 inches in length along their inner edges; were about 33 inches above the floor level; and were from 18 to 20 inches deep. Their free edges were set with flat stones laid in adobe, the rest of the bench being surfaced with the latter. The backs of the recesses, except the deep southern one, were plastered upon the earth. The south recess was about 6 feet deep, with the sides and back stoned. The back of the north recess, lying toward the pueblo, was, like all of the others, nearly perpendicular, except that in this case the upper part sloped sharply backward, and like all the others its surface was deeply smoked.

The pilasters were from 26 to 27 inches wide upon the face, and the top of those best preserved rose about 21 to 24 inches above the

level of the banquette. The well-faced stones forming the inner circle of the kiva were on the average about 3 inches thick and 4 inches long, well set in adobe, and were smaller, as is usually the case, than those forming the face and sides of the pilasters. Both were thickly plastered; the plaster, however, readily flaked off on exposure and its fracture showed six layers. The floor of the kiva was about 9½ feet below the general floor levels of the pueblo.

Near the center of the back of the north recess we found an arched doorway from the banquette level (figure 2) about 20 inches wide and 23 inches high in the middle. Beyond this a similarly arched passageway, now filled with a densely packed mass of building stones and earth, led directly with a slightly rising floor, to the line of the manhole in the middle front room (figure 1). The walls of this passage and its doorway and floor were formed of adobe plastered on the earth, and the surfaces were densely smoked. 7 inches below the middle segment of the northern banquette is a niche or cubby-hole 11 inches wide, 8 inches high and 10 inches deep, lined with flat stones and adobe (figure 2).

In the floor of the kiva, at about 7 feet 6 inches from its north lower wall, is the northern edge of a circular fire pit, 27 inches in its north and south, and 30 inches in its east and west diameters. The edges of this fire pit are in part formed by flat stones set in adobe, in part by the adobe floor carried over the edge. It was about 12 inches deep and full of clear ashes with few charcoal fragments.

Nearly midway between the fire pit and the north wall is a well-constructed *sipapu* (figure 2), the opening of which is 3 inches in diameter. This is formed by the neck of an olla irregularly fractured from its body. The flare of the rim of the olla is about a half inch, it is set flush with the plastered floor of the kiva and is decorated with four symmetrical clusters of three painted bands crossing the flare of the rim. About 2 inches below the top of the rim the *sipapu* widens to about four inches in diameter and from the opening is about 5 inches deep. The flask-like cavity is lined with small flat stones and irregular pieces of broken pottery set in adobe, with which the bottom is formed. The *sipapu* was filled with sand and was without a cover.

Beneath the middle portion of the southern banquette is a doorway to the horizontal tunnel of the ventilator, 22 inches high and 15 inches wide, with a flat stone lintel and sill. The bottom of this tunnel is on a level with the floor of the kiva, sloping slightly upward as it recedes. Outside and close behind the south wall of the deep recess, about 18 inches below the general surface of the ground, we found the square stoned opening of the perpendicular shaft of the ventilator (see figure 3) about a foot in diameter. This shaft was followed down through several tiers of flat stones in place, but we did not have time to complete its connection with the horizontal portion.

Between the kival opening to the ventilator and the south side of the fire pit lay two rough stone slabs, approximately 23 inches high, 15 inches wide, and 3½ inches thick, fallen over the south side of the fire pit. These I conjecture formed a deflector when standing upright. The floor of the kiva was smoothly plastered.

FIG. 3.—Exterior opening of the ventilator, Ruin no. v.

In this ruin a north and south compass line, drawn at right angles to the face of the pueblo at its middle point, passes nearly over the center of the manhole in the front middle room, traverses the passageway to the kiva, runs along the east side of the niche, bisects the *sipapu* and the fire pit, and nearly coincides with the western side of the horizontal tunnel of the ventilator.

Few artifacts were found in this ruin. In the kiva, on the floor near the *sipapu*, was a large well-formed and finished *tcamahias* [1] or stone scraper; and in the debris near the floor were a few turkey-bone awls and unworked turkey bones; a rough flint arrowpoint; a pottery polishing stone; a roughly flaked flint celt about 5 inches

[1] Fewkes, "Antiquities of the Mesa Verde National Park." *Bulletin 41. Bureau of American Ethnology* (1909), p. 39.

long; and some chips of flint. The few fragments of pottery found were of corrugated and smooth, thick decorated ware, not sufficiently abundant and differentiated from that presently to be described from other similar ruins to justify a separate consideration here. The rooms of the pueblo revealed nothing noteworthy in the way of artifacts.

Ruin No. VI

The next ruin group examined, no. VI, lies several miles west of the Cohon mesa, upon the great sage and piñon upland between the upper reaches of Cross canyon and Dove creek on the east and Squaw canyon on the west. This is known as Squaw mesa, and the ruin, Squaw Point ruin, lies toward its southern end. I cannot give its exact location, because there is as yet no accurate published map of the district. The ruin is most conveniently reached from the small settlement called Dove creek, on the Dolores-Monticello road. Here are a store and post office kept by the Stokes Brothers, who are prepared to furnish grain and fodder and provision for those who pass this way, and who know the country hereabouts. The ruin is reached from Dove creek by traveling southward over a rough wagon road about 6 miles and then for some 9 miles, without beaten track along the sagebrush sags and ridges.

The cattlemen of this region know these ruins well on account of the ancient artificial reservoir belonging to them, which is still of great service during certain seasons in this waterless land. The ruins lie in an irregular sagebrush opening in the piñons covering about 500 acres, in which a series of shallow washes from various directions unite to form one of the small tributaries of Cross canyon. The ruins here are of two distinct forms. First, those of the unit type occupying a long sage-clad ridge on the western side of the open tract and some small outlying spurs; and second, on the eastern side of the opening, on an elevated tongue of rock between two shallow washes, is a great compact mass formed of the still half-standing walls of many square and circular rooms, the whole some 400 by 450 feet across. The trim, unweathered stones, the many still erect walls; and the well-preserved timbers of this great com-

pact congeries of rooms, tier above tier, would seem to mark this ruin as of a later period than the fallen, disintegrated, often largely obliterated structures of the former group upon the ridge near by. Between the two groups of ruins is a large slope of bare rock, across the lower end of which in prehistoric times a broad, low, earthern dam had been thrown, forming a reservoir which is capable when full of holding a large quantity of water gathering from the long slopes on three sides. At the time of our visit the reservoir was partly filled with water, upon which we and our horses and mules and a varying floating population of range horses subsisted during our two weeks' time here, the loss of water during this period, in early July, being largely from evaporation.

The long sagebrush ridge on which the ruins which especially concern us lie, runs approximately north and south; the southern end, facing across the McElmo valley toward Ute mountain, swings a little to the southeast. The ruins lie across the axis of this ridge, in irregular parallel rows, extending one behind the other along its summit and down its eastern slope. There are a few single-kiva ruins in the group, but most of them are composed of two or three kivas with their corresponding pueblos placed end to end and facing southward. Altogether there are at least twenty-four of these single, duplex, and triplex forms well defined on this ridge and its outlying spurs. The burial mounds are regularly placed south or southeast of the rows of kivas, and in most instances there is a separate burial mound for each of the houses, although these are frequently not more than 50 or 60 feet apart. The sites of the pueblos are all low mounds, the surface stones so broken and weathered as hardly to show they have been shaped and dressed and with no marks of walls visible. The pueblo sites, as well as the usually well-defined kiva pits, are now all densely sage grown. There are among the others numerous slight mounds with associated depressions so ill defined that, though suggesting ruin sites, they will require excavation for the determination of their nature.

The particular ruin of this group selected for excavation lies at the southern end of the ridge as it falls off into a piñon-covered sag. Here are three kivas in a row with separate low pueblo mounds

north of two of them. The middle one of these kivas with its house was selected. The mound, as we found it, including its slopes, was about 58 feet long, about 18 feet wide, and rose some 4 feet above the general level of the ground (figure 4). The nearest edge of the burial mound was about 72 feet southeast of the pueblo.

The Pueblo.—This pueblo shows well a common feature of these ruins, namely an irregularity of outline and a rough careless construction of the masonry, in striking contrast to the uniform pro-

FIG. 4.—Ruin no. v. on Squaw point, before excavation. Showing the elongated heap or "mound" of disintegrated stones, with the slightly depressed kiva site in the foreground between the shovel handle and the "mound."

portions, the well-laid masonry, and the painstaking finish and plastering of the kiva and its accessories. Our estimate of the amount of trimmed stone fallen from the pueblo walls, both within and without the rooms and in the kiva, indicates that these could not have been more than 6 or 7 feet in height, and hence that this pueblo, like all the others of this type which I have examined in detail, was a one-story structure.

On excavation it was found that the pueblo in this ruin is not, as is commonly the case, symmetrically placed in relation to the north and south axis of the kiva, for it forms a slight angle with this and its larger part lies west of this line (see ground plan, figure 5). Its front wall stands about 8 feet north of the inner circle of the kiva.

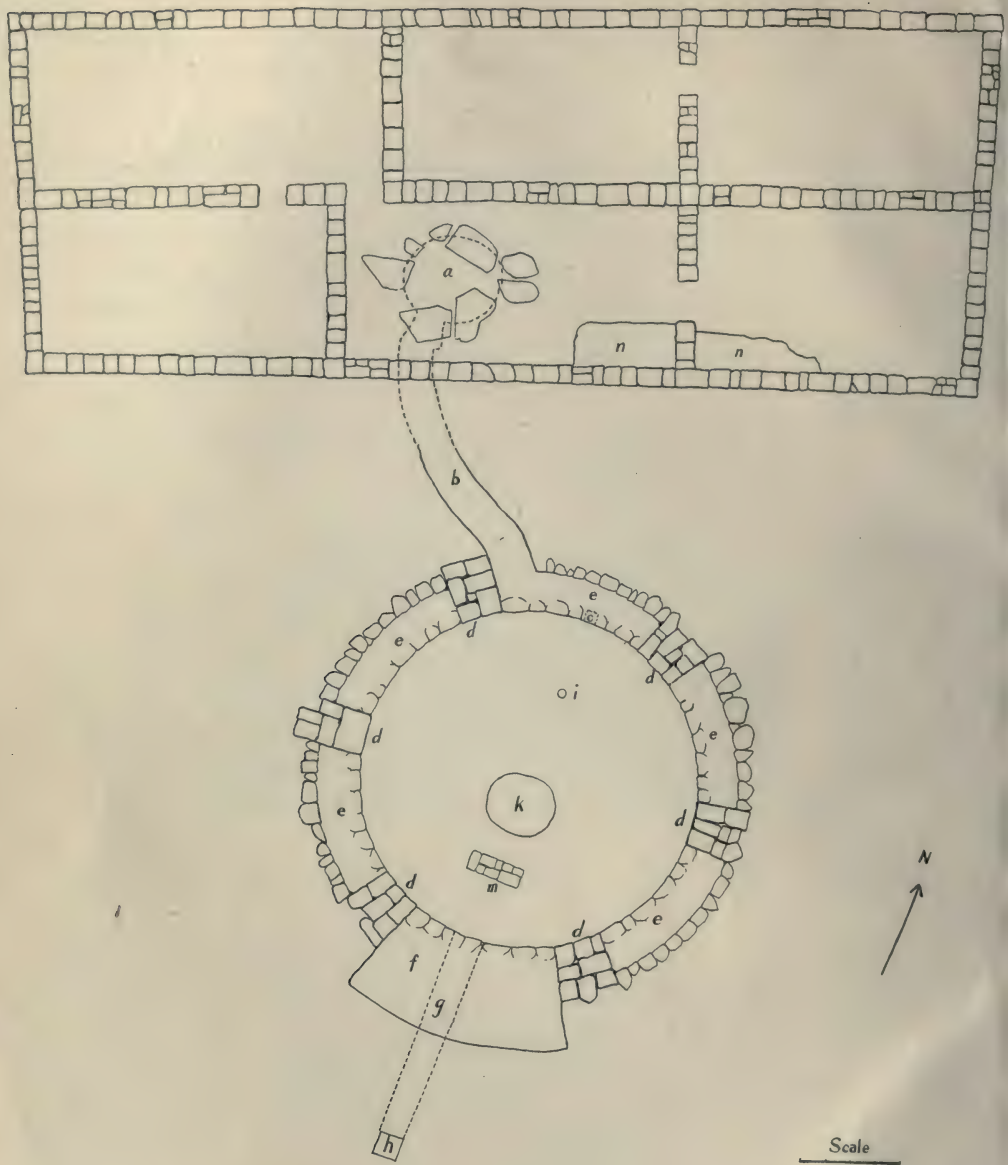


FIG. 5.—Ground plan of Ruin no. VI. on Squaw point. *a*, Manhole into tunnel to kiva. *b*, Underground tunnel from front room of pueblo to kiva. *c*, Cubby hole or niche in the north wall of kiva beneath banquette. *d*, Pilasters for the support of the roof timbers. *e*, Recesses between the pilasters with banquettes about 33 inches above the kiva floor level; the backs of these recesses, unlike those of fig. 1, are set with stones except in the southern recess. *f*, deep southern recess and banquette. *g*, Horizontal portion of the ventilator flue opening within at the floor level. Perpendicular shaft of the ventilator opening at the ground level. *i*, *Sipapu* in kiva floor. *k*, Fire pit in the floor. *m*, Stone wall deflector between the fire-pit and the ventilator opening. *n*, Stone benches possibly for mealing purposes.

It is approximately 39 feet long and from 14½ to 15½ feet wide exteriorly, its north side being a little longer than the south and its eastern end a little wider than the western. Its walls are from 9 to 12 inches thick and it contains six rooms of the relative size shown in figure 5. The buried walls were standing in places 3 feet high, in others not more than a foot above the level of the ground, and their tops were covered from 6 to 18 inches with debris and drift and fallen building stones. There were no evidences of exterior doorways, but several interior doors from room to room were found as indicated in the ground plan (figure 5 and in plate 1, *d*). The sills of these doors were from 18 to 24 inches above the floor levels; one was 18 inches, two 14 inches wide. The tops of all the doorways had fallen with the walls. The floors of the room were not plastered but formed of trodden earth, and those in the north tier were at different levels, all lower than those of the south tier, and some of them were a foot or more below the bottom of the walls.

The top of the manhole leading to the underground passage to the kiva had partly caved in, so that its exact size and shape were not determinable, but its situation in the middle front room (figure 5) was revealed by a number of flat stones irregularly distributed about it. Digging down at the center of these stones we found a bell-shaped circular chamber with level floor, whose walls were well defined by the smoked plaster upon them. This chamber at the bottom was about 3 feet 6 inches in the north and south diameter, and about 4 feet in the east and west diameter, narrowing at first very slightly from the bottom, then drawing in sharply to a diameter of about 20 inches, 4 feet above the level of the floor. The whole depth of the chamber from the floor to the level of the floor of the room above in which the manhole opens is about 5 feet 3 inches.

A curved passageway about 18 inches wide led from this bell-shaped chamber into the kiva, where it opened upon the north banquette close to the pilaster (see figure 5 and plate 1, *a* and *b*). The passage was caved in and completely filled with trimmed stones from the front pueblo wall, several thin stone slabs, and debris. Its outlines were readily made out, however, because several large, thin, densely smoked stone slabs were still in place along its sides.

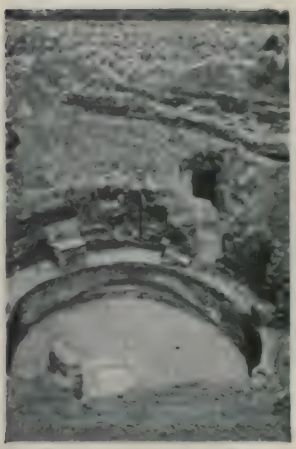
These were about 2 feet high, and this was probably the approximate height of the passageway. The floor of the passage sloped irregularly upward from the level of the banquette at which it started, passed beneath the front wall of the pueblo (see plate 1, *a* and *b*) and ended at a step of about 12 inches down to the floor of the chamber.

This larger or smaller bulge or chamber in the passageway from the kiva to the pueblo is a regular feature in these ruins, giving space for the individual making his way on hands and knees from the kiva to the pueblo, as he must through the horizontal part of the passage, to unbend before raising himself up through the manhole.

The rooms of the pueblo (plate 1, *d*) were largely filled to the height of the yet standing walls with trimmed stones fallen from the masonry, all closely packed with soil, sand drift, and rock fragments. In the corners of the middle and east front rooms near the door (see figure 5 and plate 1, *d*) were roughly constructed elevated platforms of stone and adobe, about 4 feet long, from 12 to 18 inches wide and from 6 to 12 inches high. From the presence of large thin stone slabs near these narrow platforms and of several hand grinding stones—"mullers," in these rooms, it is conjectured that these platforms were remnants of corn-grinding places.

There were everywhere in the upper layers of the room debris, small fragments of pottery, mostly corrugated and smooth with black-banded decoration. But these have no obvious relationship to the original occupants, since they were apparently deposited there after the house had long been in ruins. Near the floor level, as is usual in these ruins, one found a mass of larger and smaller fragments of hard adobe which had been laid on and between the surfaces of the fallen roof timbers and bore the marks of their surfaces, while the parts which had evidently been pressed through between the timbers were densely smoked. The tracings upon these fragments of adobe showed that the roof timbers, here as in the other ruins of this type, for the most part had been split or peeled before having been laid and plastered. In one of the rooms the charred remnants of several roof timbers lay upon the floor,

a



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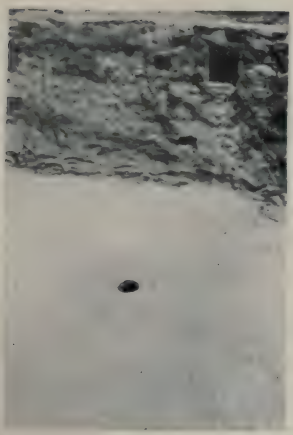

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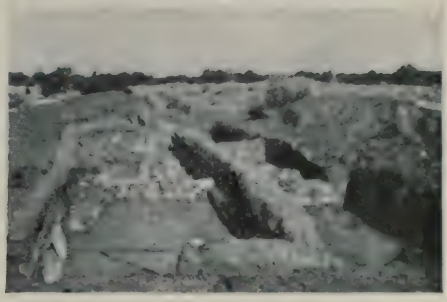


d

RUIN NO. VI. ON SQUAW POINT AFTER EXCAVATION

a. General view of the pueblo and kiva with underground passage partly caved in. *b*. Kiva, showing pilasters, banquettes, deflector fire pit and *sipapu*. *c*. *Sipapu* in floor and niche in north wall. *d*. End view of excavated pueblo showing doors between rooms.

their outlines so well preserved, though little of the wood remained, that one could infer that, when in place, they lay north and south from wall to wall.

At the floor levels in all the rooms there were a few fragments of rough corrugated ware, a few of smooth ware finished with white slip with banded and linear decorations in black. There were found at or near the floor level, two stone axes, several polishing stones, some partly chipped flint, a few turkey-bone awls and unworked turkey bones, a small piece of hematite with ground surfaces, part of a metate, a granite hammer and a granite discoidal rubbing stone, nine spheroidal pounding stones from 2 to 3 inches in diameter, and several mullers. Most of the latter were formed of sandstone, but several were of conglomerate rock, whose firmly cemented constituents, including many flint pebbles from one eighth to a quarter of an inch in diameter, must have made them very effective instruments.

In three of the rooms there was much scattered charcoal in small fragments and small heaps of ashes at the floor level. In the corner of one room about 18 inches below the top of the mound and about as far above the floor level we found among the fallen stones in the debris a large compact mass of ashes and charcoal fragments held in place by a few stones. This was evidently an improvised fireplace in use long after the early floor level had been abandoned, whether by the original owners, or, as is also possible, by others at a much later time and when the house was a ruin with barely sheltering walls still standing, is not evident. There seemed to be no difference in the fragments of pottery found at this level from those exposed near the floor. This seems of some importance, because it reminds one of the difference in significance which may attach to artifacts found in the upper layers of the debris in such ruins and those at or near the floor levels.

The Kiva.—The kiva was filled for about 3 feet below the surface with closely packed, fine, reddish sand laid in layers of from one to three inches thick with many dark to black layers between. This material is clearly drift, and one may conjecture that these dark streaks mark successive fires to which in the long processes of

filling up of the kiva the district has been subjected. The rest of the kiva to the bottom was so densely packed with sand, adobe, and dressed building stones, fallen in from the pilasters and the adjacent pueblo, that the constant use of the pick was necessary. These stones were most abundant in the northern segment where the front walls of the pueblo had fallen, while several slabs of various sizes lay about the middle. Save for numerous small fragments of pottery, corrugated, painted, and plain gray, which were scattered through the mass from top to bottom, there were few artifacts in this kiva. At or near the floor level and on the benches were a few turkey-bone awls, a stone axe, fragments of corrugated and smooth pottery, a broken corrugated pot, a few mullers and polishing stones, one spheroidal pounding stone, and numerous flint chips.

On clearing, the kiva (figure 5 and plate 1, *a* and *b*) is found to be a six-pilastered, recessed, stoned structure with a deeper southern recess, a ventilator, deflector, fire pit, *sipapu*, and a doorway leading to the pueblo. The following measurements should be recorded. The inner circle is approximately 13 feet in diameter, flaring very slightly from the floor. The banquettes are 33 inches above the floor, are approximately 5 feet long on their inner faces and vary in depth from 18 to 21 inches. The southern banquette, however, is about 4 feet deep. The wall of the lower circle is formed of well-trimmed stones from 4 to 5 inches long and 2 to 3 inches thick, and upon this, set a little back of flush, rest the pilasters, formed of larger stones set, as is usual, without breaking joints.

The pilasters are from 21 to 24 inches wide across the face, and those which are best preserved stand from 32 to 35 inches above the level of the banquettes. Their tops are thus from 65 to 68 inches above the level of the floor. The banquettes are formed at the front by flat, smooth stones about 2 inches thick set in adobe. These extend back from 6 to 10 inches, the remainder of the bench being formed of adobe. The backs of the shallower recesses, about 30 inches high, are irregularly set with roughly trimmed stones, and, while in general nearly perpendicular, in places flare outward at the top some 3 inches. The back of the deeper southern recess was unstoned, being plastered directly upon the earth. Its sides

were stoned as far back as the pilasters extended. The masonry of this, as of the other kivas examined, is formed of single walls of stones set against the earth, except the pilasters, which above the bench form a cubical mass of larger stones. The plaster on the lower walls of the kiva was largely in place, showing in its thicker portions ten layers, but this as well as the plaster facing the pilasters, readily peeled off on exposure. The surfaces of all the upper parts of the kiva walls, especially above the banquettes, were densely smoked.

At the western end of the northern banquette, close beside the pilaster, is a square doorway to the curving passage above described, leading to the pueblo (see plate 1, *a* and *b*). About 4 inches below this banquette is a cubby or niche in the lower wall 6 inches wide and 7 inches high (plate 1, *c*). About 5 inches east of the door to the passage, and about 5 inches above the level of the banquette, a roughly formed spheroidal pounding stone 2½ inches in diameter is set flush in the back wall of the recess. It is loose and readily taken out of the cavity in the masonry, which it exactly fits. I have no clue to its meaning or purpose. The floor of the kiva was about 7 feet below the floor level of the front row of rooms of the pueblo. A north and south compass line through the center of the kiva nearly bisects the ventilator opening, the deflector, the fire pit, the *sipapu*, and the niche in the north wall.

In the well-plastered floor of the kiva, about 33 inches from the north lower wall, is the *sipapu* (see plate 1, *b*, *c*). This is formed at the top for 2 inches in depth, from the neck of a broken olla 3½ inches in internal diameter, with a flare of five eighths of an inch, the top of which is set flush with the floor. Below the neck the cavity bulges slightly, without special lining, and its hard bottom is 9 inches deep. It was filled with sand and was uncovered.

About 39 inches south of the edge of the rim of the *sipapu* is the northern side of the oblong fire pit (plate 1, *b*). This is 28 inches in the north and south diameter; 33 inches in the east and west diameter; 18 inches deep at its center; the bottom is plastered and the rim is formed in part by a few flat stones set in adobe, but mostly by adobe continuous with that forming the kiva floor. It was nearly full of clear ashes.

About 13 inches south of the southern edge of the fire pit is a wall of trimmed stone forming the deflector (figure 5 and plate 1, *b*), about 26½ inches wide, 25½ inches high and 9½ inches thick. The stones are well laid in adobe. About 30 inches south of the deflector, the inner wall of the kiva beneath the deep southern banquette, is recessed about 3 inches and at the center of this recess is the opening of the ventilator, about 26 inches wide, the bottom flush with the floor of the kiva. The top of the ventilator shaft was caved in at this part, but the opening, judging from the lines of stones still in place, appeared to have been slightly higher than its width. About 5 feet south of the back of the deep southern recess and one foot below the surface of the ground, we found the partially stoned perpendicular shaft of the ventilator measuring about 8 by 12 inches.

The Burial Mound.—About 72 feet southeast of the kiva is the nearest edge of the burial mound. It lies at the southern end of the ridge on which this group of ruins is situated and extends a few feet down the slope. It is about 40 feet across north and south, and some 30 feet east and west. The dark soil of which it is composed varies from 2 to 4 feet in depth, thinning out irregularly at its borders. Small fragments of pottery are everywhere abundant in the soil. It did not appear to have been disturbed. Beneath the dark soil one comes abruptly upon the compact reddish-yellow natural earth of the region. The entire area was turned over, the men working both ways along the sides of exploratory trenches.

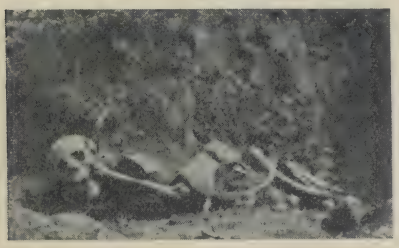


FIG. 6.—Skeleton and part of olla over pelvis in the burial mound of Ruin no. VI.

Nine burials were found, three of them young children; five near the southern end of the mound area, four near its center. Their depth varied from 6 inches to 2 feet below the surface. The placing of the bodies seemed to have been without reference to the points of the compass. Those in which the determination could be made were placed in the flexed position, four lying on the right side, one on the

left. In some there had been considerable displacement of the bones in the soil. In only three cases were the bones fairly intact and all were very friable.

Pottery—ladles, bowls or ollas—either whole or in pieces, were found either near or upon the bones, in six of the nine burials. In one case the inverted top of a large smooth ware olla with a bone awl lying in the sand and soil which it contained was placed over the pelvis (see figure 6); in another (see figure 7) a bowl lay near the head. Views of the skull of figure 6 are seen in figure 8, showing the occipital flattening and other features found in the three of the skulls from this mound sufficiently intact for the determination. The teeth of this and other intact skulls were worn down and flat at their free edges. In one case a fragment of much decayed wood about an inch thick and five inches long was found with the pottery near the remnants of the bones of the children. No other artifacts except the pottery and bone awl above mentioned and a square conglomerate grinding stone were found with these bodies. But scattered through the soil of the mound were found a small dumbbell-shaped object, perhaps a pendant, of polished hematite about three-fourths of an inch long and one-fourth of an inch in diameter; a bone flint flaker; part of a deer-bone scraper; a turkey-bone awl; several pottery polishing stones; four spheroidal pounding stones from 2 to 3 inches in diameter; and a small ball of unburnt clay.

FIG. 7.—Skeleton and bowl near head in burial mound of Ruin no. VI.

The absence of pottery from some of the burials might well have been due to their nearness to the surface of the ground, favoring its destruction by the elements or its annexation by modern passers-by. Judging from the great number and variety of the fragments of pottery which the soil of this mound contained it would seem to have served for a long period either as a burial place or as a rubbish heap.

None of the bodies were covered by stone slabs, as is the case in many burial mounds in this region, and none of the bodies were placed in shallow pits below the general level of the natural surface of the ground, as was also frequently done when the accumulation of waste forming the mound was meager; but in most of these burials which were fairly intact, small flat stones from 5 to 7 inches across were found over the bodies, usually near the head.

The approximately intact pieces of pottery from this mound are shown in plate II. The most common fragments were either corrugated ware or smooth decorated food bowls. The smooth ware, both the whole pieces and the fragments, was commonly thick, sometimes gray, but usually finished with a white slip and bore a great variety of rather simple decorative designs in black, largely

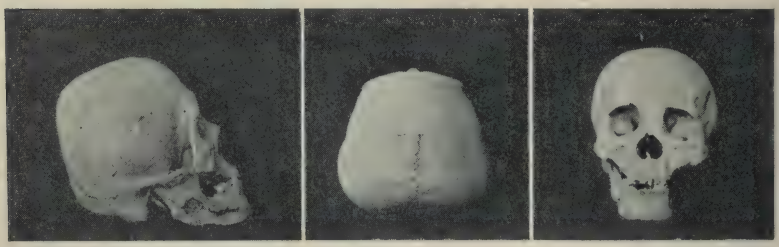


FIG. 8.—Skull from burial shown in fig. 6.

limited to the inside. A few of these food bowl designs are reproduced in figure 9.[1] Their thick edges frequently showed coarse dots or short cross bands which were often grouped, leaving plain spaces between. Occasionally a simple isolated geometrical figure was made on the outside of the bowls just below the rim. There were in this mound many, and in the kiva a few, small fragments of red bowls, with well-polished surfaces, and decorations in black; and this red ware was of finer texture and finish than most of the white and gray. I found no whole pieces of it. Many of the fragments of the red ware as well as some of the better types of the white had been drilled for purposes of repair.

[1] Drawn from specimens by Elizabeth B. Prudden.

POTTERY FROM THE BURIAL MOUND OF RUIN NO. VI

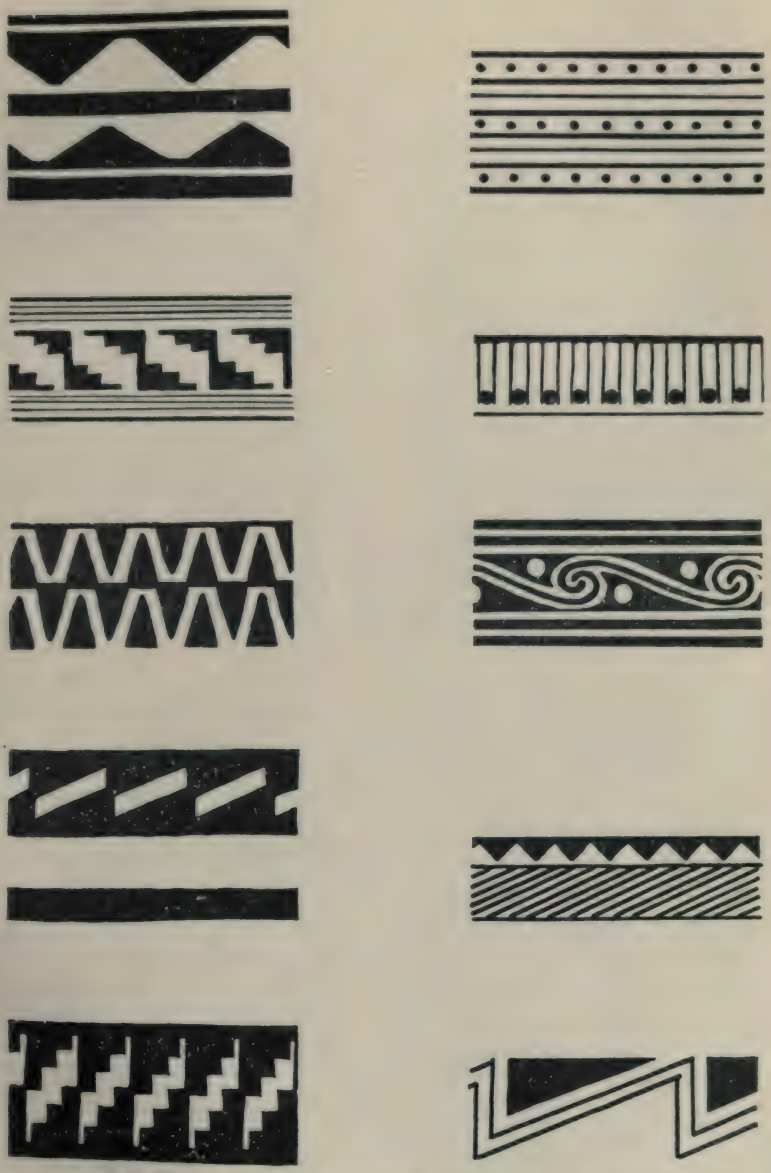


FIG. 9.—Decorative designs from fragments of food bowls in the burial mound of Ruin no. VI.

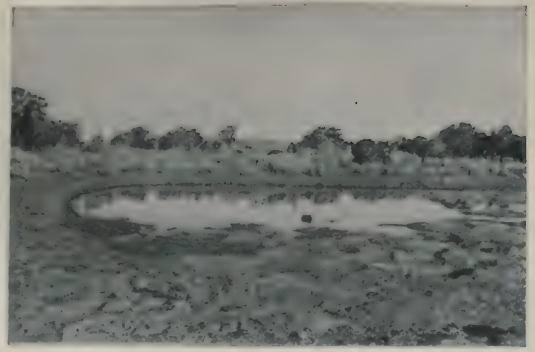
RUIN NO. VII

The last ruin examined—no. VII of the series—is one of a group several miles west of the last, on the great upland called "Bug mesa," situated between Squaw canyon and Monument canyon farther west.[1] This Bug mesa ruin lies somewhat over six miles southward of Bug spring, a locally well-known watering place and cattle ranch; and is most conveniently reached from Dove creek by a rough wagon road which passes the spring.

This group of ruins in many respects resembles the last described. In an irregular opening in the piñons, several acres in area, is a series of shallow washes converging to form a rocky stream bed, which rapidly deepens to a gorge. Rising above the right bank of the wash is a great irregular mass covering an area of approximately 400 by 200 feet and formed by a congeries of partly upright, partly fallen walls, showing the outlines of many rows of square rooms and circular structures close to the southward of them. The whole ruin mass appears to be above the level of the rock surface on which it stands. Across the stream bed, a few yards away, is a straggling series of irregular fallen structures composed of large and small buildings, courts, and passageways. A rough, partly demolished wall crosses the stream bed between the two parts of the ruin. The building stones of this ruin are well dressed; some of the walls are standing 10 or 12 feet above their base, with indications of two or more stories. Fragments of timbers are still well preserved; and this, together with the absence of marked weathering of the building stones and the freedom of the ruin in general from sand drift and soil accumulation, conveys the impression that it is not of great age as compared with the adjacent ruins of the unit type which especially concern us here.

Westward less than 100 yards from this big ruin is a short sage-

[1] On the reconnaissance map of this region published by the writer in 1903 (*American Anthropologist* (N. S.), vol. 5, April–June, 1903) the canyon now known as Monument canyon is called Bug canyon, and the main Squaw canyon was called Pierson canyon, these being the local designation at that time for these imposing but officially nameless gorges. It is now clear that some parts of the course of these canyons is not very accurately shown on this map, since the details were only determined as well as might be from a general horseback and compass survey reinforced by the data and views, not always harmonious, of local cattlemen who at that time ranged the region.



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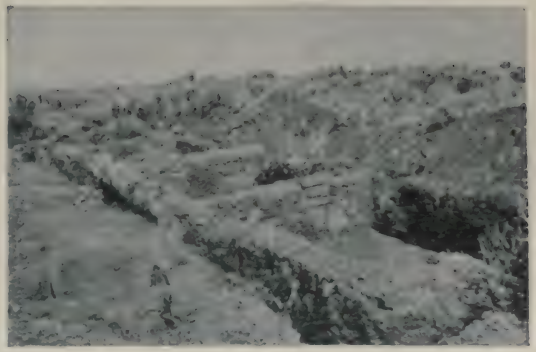

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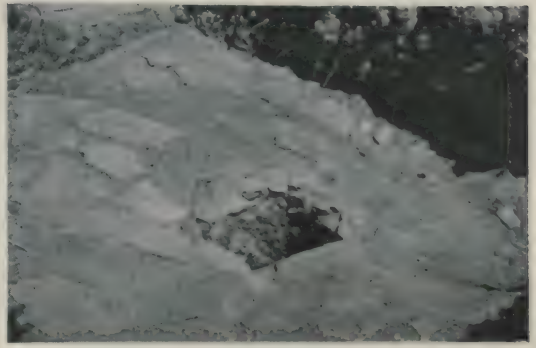

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RUIN NO. VII. ON BUG MESA

a. Prehistoric artificial reservoir. *b*. The excavated pueblo. *c*. Small enclosure or bin in corner of Room II (see fig. 10) filled with shelled corn. *d*. Manhole in floor of Room III, leading to underground tunnel to kiva (see fig. 10).

grown ridge on which are closely clustered at least twelve ruins of the unit type, mostly with two or three kiva pits and long inconspicuous pueblo mounds. A little farther westward, across a shallow wash, is another longer and wider sagebrush ridge over which at least twenty similar ruins are irregularly scattered, some with a single kiva pit, others with two and three. The burial mounds lying close to the southward of apparently nearly all of these small ruins had been thoroughly ravaged. The wash between these two ruin-covered ridges widens out northward into a bare slope of rock across the lower end of which, before the white men came, an earth dam had been thrown affording a reservoir of considerable capacity (plate III, *a*).

I was not able to form an opinion as to whether the artificial reservoirs at the Squaw point and at the Bug point ruins probably belonged to the one or the other types of ruins near by or may have been used by the people of both at their apparently different periods of occupancy. The cattle men in recent times have made a short dam below the original one at the Bug ruins to supplement the water supply on this range.

The small ruin selected for special examination lies at the southern end of the ridge nearest the big ruin. There were in this two well-defined kiva pits about 27 feet across and about 2 feet below the general level at their centers. No walls were visible in or about them. The long pueblo mound close to the north of the kiva pits, showing only a few broken and weathered stones at its flat summit, was about 18 inches above the general level. The burial mound was a short distance southeast of the kiva sites. After establishing the exterior dimensions of the pueblo we selected its eastern end and the corresponding kiva for such study as might be permitted by time and the meager water supply rapidly dwindling under the July sun.

The Pueblo.—The exterior of the entire pueblo was 92 feet long and about 10½ feet wide; its walls were from 9 to 11 inches thick, and it consisted of a single row of rectangular rooms, varying somewhat in size (see figure 10 and plate III, *b*). The walls were standing from 18 to 30 inches above the floor levels, which were about the

same as that of the surrounding ground surface. No doorways were found between the rooms, the walls in most places having fallen to below the level at which they are commonly placed in these ruins.

While most of the pueblos of this type which we have excavated have contained few artifacts, nearly all of the rooms in this house which we had time to dig out revealed many conditions and articles of interest. In the first place the whole eastern end of the pueblo had been burned, the roof had fallen in upon the possessions of its thrifty occupants, and such objects in the rooms as the fire and time had spared lay undisturbed beneath the wreckage of later fallen walls and the accumulated soil and sand drift. The fallen timbers within the rooms were represented only by some small charred fragments, but the masses of adobe mud, bearing the impress of the split timbers upon and between which it had been plastered, served to locate the position of the fallen roof in the debris, and showed that while most of the artifacts found here were within the rooms at the time of the catastrophe, some of the broken pots and several flat rocks had probably come down with the roof upon the upper layers of whose wreckage they lay.

Room I (see figure 10) presented little of interest; a few fragments of food bowls, a bone awl, a muller, and a stone hammer were found in the mass of fallen building stones and drift with which the room was filled.

Room II was noteworthy for the large number of pieces of pottery of various forms, broken and intact, which lay upon or near the plastered floor; and for the large amount of charred corn which was heaped upon the floor, or was contained in large ollas, or lay in scattered masses with the fragments of the broken ollas which evidently had contained it. In the southwest corner of this room was a shallow bin formed of stone and adobe (plate III, *c*), filled with shelled charred corn, which was also heaped up against the west wall. Altogether there was not less than a bushel of charred corn in this room, scattered and in heaps and in jars. Most of this corn was shelled, but some was still on the ear, all charred, and in a few instances the inner layers of the husk were still in place (figure 11).

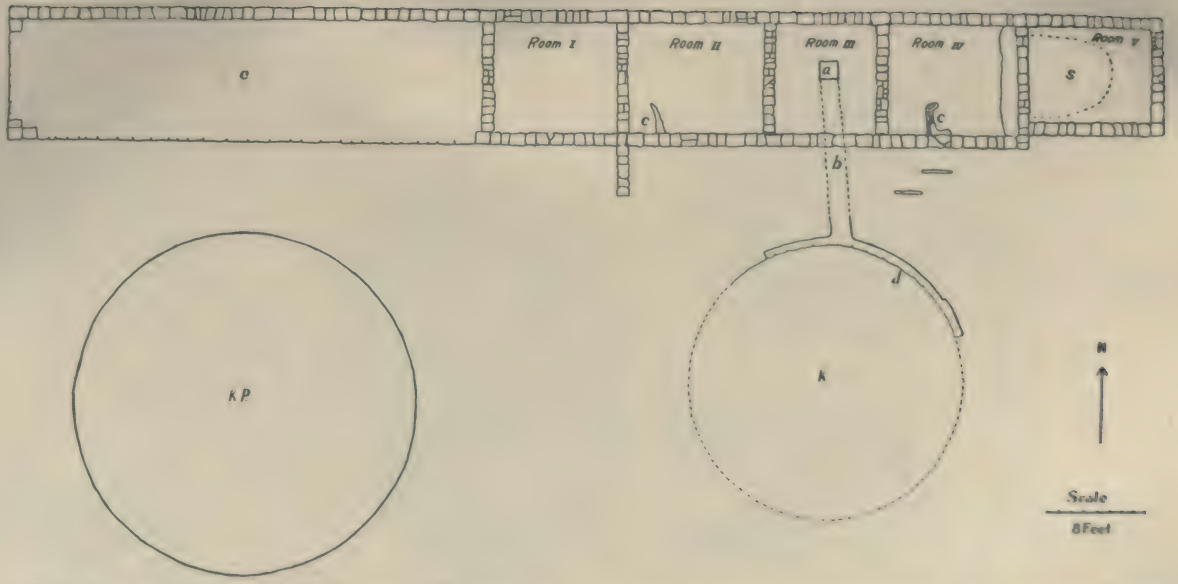


FIG. 10.—Ground plan of Ruin no. VII on Bug mesa. *a*. Manhole of underground tunnel to kiva. *b*. Tunnel opening below on northern banquette of kiva. *c*, Small bins for corn storage. *d*, Narrow banquette. *e*, Rooms not excavated. *s*, Slag heap. *k*, Partially excavated kiva. *k. p.*, "Kiva pit" or shallow depression marking the site of a buried kiva. This surface depression almost always has a greater diameter than the kiva itself because the surrounding earth has usually slumped in during or after the falling of the kiva roof.

All of the ears of corn found in this ruin, as well as the many free cobs scattered about, were short, averaging not more than 3 inches in length. One of the smaller pots contained a handful of charred grass seed.

Thirteen pieces of pottery were found in this room. Several of the smaller pieces and two of the larger ones were nearly intact, but most of them had been overturned, or smashed where they lay, all the pieces being found together. One large broken corrugated olla lay above the stratum of roof mud and presumably had fallen with the roof. Upon or near the floor were several large corrugated pots, but the more abundant pieces were smooth ware, gray or with white slip and linear or band decorations in black. Represented in the smooth ware were ollas, food bowls, dippers, mugs, and canteen forms (see plate IV and figures 12, 13). Several lids to the ollas and pots were found beside them. Some of these were made of thin slabs of sandstone roughly rounded; but the more abundant were crudely fashioned from adobe mud which apparently had been shaped and pressed while soft into place when the jars were full, as they all bore upon their under surfaces the impress of corn cobs with which the shelled corn in the jars appears to have been covered (see figure 14).[1] Most of the pottery showed no trace of the fire which destroyed the pueblo, but a mug, a food bowl, and parts of a large corrugated pot were baked to a dull red color, with the partial fading of the painted decoration of such as bore it.

FIG. 11.—Corn on the ear, charred. On the right, one ear is in the husk.

[1] I am informed by Clayton Wetherill that the stopping with adobe of the mouths of jars filled with corn was common in several of the cliff houses which he and his brothers have excavated in Colorado, Utah, and Arizona. But in his experience the corn in the jars was protected by a layer of cedar bark which left its impress upon the under surfaces of the mud stoppers which in our specimens show marks of the cobs.

POTTERY FROM ROOM II OF RUIN NO. VII ON BUG MESA

In Room III, near the west wall, about 8 inches below the surface of the mound and above the stratum of roof mud, were found in an

FIG. 12.—Small olla, canteen and mugs from Room II of Ruin no. VII on Bug mesa.

area of less than a square yard, 45 flint pebbles from 2 to 3 inches in diameter, nearly all of which had been more or less flaked (see

FIG. 13.—Corrugated jars from Room II of Ruin no. VII on Bug mesa.

figure 15). There were here numerous flint flakes. All these flints were in such a position in the debris above the roof mud as to

suggest that they had been upon the roof when it burned and fell in. On clearing away the roof mud and the charcoal mixed with it, we found upon the floor of this room a large quantity of charred corn, mostly shelled, but in part still on the cob; here also were a large shattered corrugated pot and a thick food bowl. The floor of this room was roughly set with flat stones (see plate III, *d*), which near the center, toward which the floor slightly sloped, formed a rectangular eighteen-inch manhole to the tunnel leading to the kiva.

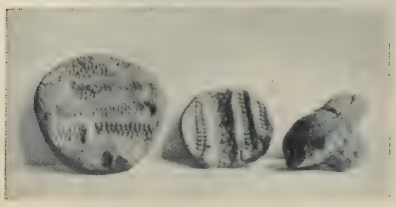


FIG. 14.—Lids of ollas formed of adobe pressed down upon corncobs apparently laid on the top of the shelled corn within.

Across the eastern end of Room IV was a rough stone and adobe bench about 6 inches high and 18 inches wide, while from its southern wall projected an irregular, shallow, partly enclosed bin formed of flat stones and adobe. This was filled with charred corn, mostly shelled, which was also piled elsewhere upon the floor beneath the masses of roof mud and mingled with pieces of wood charcoal. Altogether there was more than a bushel of corn in this room also. Part of a thick food bowl lay upon the floor here. On the low bench at the eastern end was found the charred spatulate tip apparently of a wooden utensil, and a plaited ring about 4 inches in diameter (see figure 16). Here also were found a matted mass of coarse black hair, evidently human; and a small bundle of partly charred thin narrow strips of the bark, apparently of a shrub, its inner layer striated, its outer finely punctate.

FIG. 15.—Flaked flint pebbles and partly shaped flint utensil from the Bug mesa ruin.

There were in these rooms, in addition to the articles above mentioned, eight sandstone mullers, much worn; two conglomerate

mullers worn smooth; one smooth flat sandal pattern stone; four small hand grinding stones; three stone axes; three spheroidal pounding stones; two stone pot covers; part of a sandstone metate and a stone mortar about 6 inches in diameter.

Room v, at the eastern end of the pueblo, was narrower than the others (see figure 10), and its walls were standing about 18 inches. Its floor, about one foot above the floor levels of the other rooms, was formed at the western side, of closely set flat stones, the remainder being made of a thick layer of adobe. The floor stones, as well as the layer of earth beneath them, about 5 inches thick, had evidently been exposed to heat and were very hard and red. Below this layer of baked earth was about 4 inches of black organic material resting upon a mass of white clay such as we found near by in the excavation of the kiva. The presence of these materials beneath the floor accounts for its elevation above the others in the pueblo, and with the structure of the walls give the impression that this room was rather an annex than an integral part of the house. The parts of the wall of this room still standing were thickly plastered within with adobe. This was in places deeply smoked, while other parts were red from intense heating.

FIG. 16.—Plaited ring, partly charred, from the Bug mesa ruin.

The side of this room adjacent to the pueblo is filled with a solid heap about 19 inches high composed of large and small irregular-shaped gray masses of minutely porous tufa-like material, in part—especially where the conical heap lies against the west wall—of a slag-like substance. The latter is partly porous, forming contorted masses with shiny greenish surfaces, or is in the form of reddish friable spongy masses or of excrescences upon the surfaces of the other material. Embedded in and fused to this slag-like stuff are the curled and otherwise contorted parts of thick-walled pots and

large and small fragments of baked sandstone rock. This heap of fused material forms a coherent mass covering more than half of the floor of the room, and it is the parts of the floor and walls nearest to this that are the most hardened and reddened by heat. A considerable amount of charred corn, shelled and on the cob, lay on the south side of this slag heap and on the floor beside it. Here also were a roasted and reddened food bowl and a mug without its handle.

From the condition of the floor, walls, and contents of this room it is evident that an intense heat has been developed here, either before or at the time of the burning out of the pueblo. I have submitted specimens of the slag, pottery, and roasted rock to Professor W. Campbell, professor of metallurgy in Columbia University, and wish here to express my thanks to him for his courtesy in making the examination and for permitting me to report his opinion that the degree of temperature required to produce the appearances presented by the specimens submitted to him might readily be secured with the wood and other inflammable material which this early housebuilder possessed; provided that the conditions of firing were such, either by chance or design, as to concentrate, furnace-like, the available heat.

The finding of slag-like material in the burned-out rooms of prehistoric pueblos is, I am informed, not unique; and while it is not very profitable to speculate upon the various possibilities in this instance, it is not difficult to conceive of such conditions, and the presence here of such an amount of piñon or other timber—perhaps from a burning and fallen roof—and of such a store of corn, also under certain conditions a lusty heat producer, as might readily convert this small room, with its non-conducting floor and its thick stone walls, into a veritable furnace.

The Kiva.—The kiva was found about 9 feet south of the front wall of the pueblo, its lower circle being about 21 feet in diameter. This is considerably larger than any kiva in my series of excavations. Its northern segment only was dug out, owing to the lack of time and the waning water supply. Its plastered floor was about 11 feet below the general floor levels of the pueblo. The lower circle

was walled with trimmed stones roughly set. A shallow bench, from 6 to 9 inches deep, formed of flat stones was about 42 inches above the smooth adobe-plastered floor; above the bench rose about 28 inches of smoked earth-plastered wall. At the point in the circumference in the outer circle nearest to the pueblo and to the manhole in the floor of Room no. III, was an arched doorway in the smoked earth forming the back of the shallow recess 18 inches wide and about 19 inches high, the sill being about 5 inches above the banquette level. This leads to a passage which slightly widens after it leaves the kiva, the floor and the arch gradually rising. The doorway and the tunnel are formed by adobe plastered against the soil and the heavily smoked surfaces make it easily practicable to follow the passage through the debris and stones with which it is filled.

Until the floor was reached no noteworthy artifacts were found in the kiva. But on that portion of the floor exposed there lay scattered three pointed and two flattened pieces of deer horn such as might have been used in chipping flint, and a cylindrical segment of deer horn about an inch in diameter and 3 inches long, rounded at the ends (see figure 17). There were also one turkey-bone awl; a well-formed spearhead about 3 inches long and one inch wide; and a lump of unbaked clay about 5 inches in diameter, with a groove around it apparently to facilitate its transportation by suspension.[1]

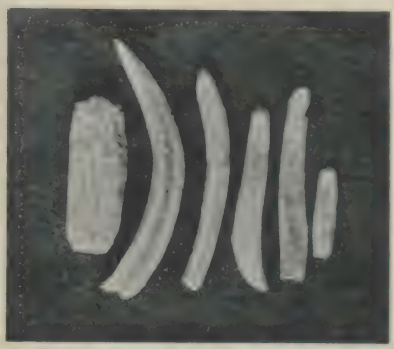


FIG. 17.—Flint flaking utensils from the kiva floor of the Bug mesa ruin.

[1] It is interesting to note that while the pottery makers of this house had apparently transported the gray clay which they used in their pottery for some distance, there was at hand, unused, close beside their kiva, a bed of excellent kaolin, the adaptability of which to pottery making the writer was moved to test by fashioning a small bowl from a specimen of this kaolin brought to New York. This achievement is not recorded in a spirit of boastfulness, since the lack of recognition of the obvious is a trait not monopolized by prehistoric people.

There were no pilasters in the 16-foot segment of the wall which we exposed, but a small jog in the wall at one side might indicate the site of a fallen pillar or some other form of roof support.

The kiva was not sufficiently cleared to secure any data relating to a *sipapu*, fire pit, deflector or ventilator. A line of wall about 4 feet long and one foot high projected from the front of the pueblo, between Rooms I and II, but there was no evidence of any enclosure. In the approximately level space in front of Room IV two stone slabs were set upright in the ground in such relations as to suggest a corn-grinding place in the court in front of the pueblo.

The Burial Mound, lying about 30 yards southeast of the kiva, had been completely ravaged and we failed to find the trace of an undisturbed burial here.

We may now summarize some of the details of these small habitations and their associated artifacts, on the basis of our special study, recorded in this and in the previous paper.

The pueblos, as a rule, were rather roughly constructed of trimmed stones laid in mortar, the bottom tier resting directly upon the ground. Some were plastered within, others apparently not; I could find no evidence of external plaster, but owing to the severe weathering conditions this might readily have wholly disappeared.

Our estimates of the amount of building stone in these ruins derived from building up segments of wall indicate that the pueblos were one-storied and not more than 7 or 8 feet high. There were commonly from three to six or eight rooms in the pueblos, depending upon whether there was one or two rows. They varied considerably in size, averaging about 7 feet by 9 and, as will be seen by the ground plans, were but crudely squared. The floor levels were commonly about that of the general ground level, but some were from a few inches to a foot below. Some of the floors were plastered with adobe, a few were laid with flat stones, but more often they seem to have been formed of the tramped earth and the surfaces had apparently been at different levels.

We found no marks or traces of ladders or notched sticks giving access to the roofs. There were no fireplaces in the rooms, but

occasionally small heaps of ashes lay along or near the side walls. In Ruin no. VII there were roughly made low narrow stone and adobe platforms in the corners of two rooms which may have been permanent mealing places. Small shallow stone and adobe bins had been made at the sides of two rooms in the same ruin for the storage of corn which we found filling them and spreading out upon the floor.

The circular or square manholes leading to the kiva in the floor of the center rooms—of the front row when two rows were present—were bordered with flat stones at the top of a shallow lining wall. This protected the upper part of the perpendicular portion of the passageway to the kiva. Below the stone-protected opening the passage bulged in various degrees to form a turning space for the body of the kiva habituate as he came out through the horizontal part of the passageway from the kiva. This passage was always so low and narrow as to require a crawling posture and such of the jambs and sills of the kiva doorways as were preserved were smooth and greasy. The passage was sometimes tunneled through the earth with an arched top, its sides being sometimes plastered with adobe, often left unplastered and in all cases more or less densely smoked. But the roof of the tunnel was sometimes supported with wood or stone and in one instance large stone slabs were set along the sides.

The roofs of the pueblos were apparently supported by cross beams, for I have repeatedly found upon the floors, lines of small remnants of much-decayed or of charred wood, judged by the growth rings to have been parts of beams of considerable size, and lying crosswise of the rooms.

With these wood remnants were always found large and small masses of usually elongated smoked adobe, bearing on their sides the impress of split or unsplit peeled timbers, apparently both piñon and cedar. Though carefully sought for, I have never found on these lumps of smoked adobe marks of small sticks or twigs or withes or cedar bark, with which kiva roofs of the Mesa Verde and elsewhere were chinked before the laying on of the mud. I conclude therefore that in the construction of the roofs of neither the pueblos

nor the kivas were these used, but that the mud was laid in a thick layer directly on to the supporting and covering roof timbers.[1]

Many of our pueblos apparently had been very small at first, consisting of only one short row of rooms, or of a single or a pair of rooms, and were enlarged by the apposition of a new line or of single rooms at the ends. These later additions were marked by the absence of any tying together of the lines of the masonry by stones from one section to another; often by a difference in the character of the stones, the trim or the laying of the wall; and sometimes by the sagging away of the untied addition from the original structure.

When it became necessary to have houses considerably larger than the common form with one or two short rows of rooms, it is usual to find added at one end a second unit with its house and kiva; the burial mound serving for both. Thus in Ruin no. VII on Bug point, Utah, the entire pueblo was 92 feet long, which is about double the usual length, forming one continuous building, with the two kivas in front of the middle of each half, and here there was a single burial mound.

This is a frequent form in the groups of old ruins on the Bug and Squaw mesas. Less frequently one finds, as a variant of the usual form, short wings, consisting of one or two rooms extending southward beside the kiva. Such winged houses are not uncommon and I think most frequent in the close communities. But my excavations have shown that the superficial appearance of short one-room wings may be created by the falling of the front walls of one or two of the middle front rooms into the kiva, as usually happens in the process of disintegration when the latter is close to the pueblo. Thus the undisturbed ruin gives the appearance of a recessed front partly enclosing the contiguous side of the shallow kiva pit into

[1] Kidder, *American Journal of Archaeology, Second Series; Journal of Archaeological Institute of America*, vol. XIV, no. 3 (1910), p. 342 describes the roof of one of the rooms of a small exposed cliff-dwelling in Utah which he found well preserved, as supported in the middle by a cedar beam eight inches in diameter, running lengthwise of the room, on which rested at right angles, four two-inch beams, while upon these and parallel to the first were laid slabs of split cedar, directly upon which lay some three inches of adobe. This construction would accord very well with the evidence derived from the uniform appearances in all the roof vestiges of the pueblos of our study; and in the kiva roofs also the adobe was plastered directly upon the timbers.

which the front walls have disappeared and been long buried under the sand drift.

In the kivas, in marked contrast to the crude character of the pueblos, no pains were commonly spared in construction and finish. The stones of the masonry were usually carefully dressed and laid in adobe mortar in a single tier against the earth before plastering. The size, proportions, orientation, and relation to the pueblo were singularly uniform. The inner edge of the upper kiva circle was in one instance close beneath the front wall of the pueblo; in one it was 9 feet away requiring a longer connecting underground passage; the others showed distances between these extremes.

Most of the kivas were about 13 feet in diameter, and the height of the pilasters, that is the outer portions of the roofs, about 6 feet above the floor. It is interesting to note in this connection that the average diameter of sixteen kivas described by Fewkes [1] in the Cliff Palace of the Mesa Verde is about 12 feet and the height of the pilasters about 6 feet. The Bug ruin kiva was larger and deeper and I regret, especially on account of the apparently great age of that whole group, not having had time to determine more fully its other characters.

It is clear from the circular kivas which have been found in other larger types of ruins in this district with the roofs partly or quite intact, that the presence of stone pilasters in the walls of these underground chambers, indicates that the roofs were of similar construction, that is, that they were laid up of timbers from the top of one pilaster to another around the circle, drawing these in with each superimposed row; the central part being formed of cross timbers in which was a smoke hole or possibly an entrance about the middle, over the fire pit. This presumption is sustained in all our kivas by the position of the tops of the intact pilasters sufficiently below the general level of the ground to allow for a court or plaza over the vaulted roof.

For it seems certain that in our kivas as in some of the others of the larger ruins, the roof was covered in with earth, forming a plaza

[1] Fewkes, "Antiquities of the Mesa Verde National Park Cliff Palace." *Bulletin 51, Bureau of American Ethnology*, (1911).

or court in front of the pueblo. The presence of several large flat stones not apparently concerned in the masonry, in the deep layer of debris filling the kivas, usually near the center, would suggest that an opening existed in the roof and that it was bordered by these stone slabs, just as it is in many of the underground ceremonial chambers of the modern Pueblo Indians to-day. But in no instance, though carefully sought, has any mark been found either on the floor or on the deep southern recess, indicating a place where a ladder of any form might have rested.

The assumption of a small flat outdoor court or plaza above the roof of the kiva seems to be strengthened by the presence in nearly all of the kivas excavated, beneath the sand drift and above the fragments of roof mud, of a large amount of earth mixed with fragments of pottery, broken stone implements, flint chips, turkey bones, bone awls, etc. This accumulation of household debris mixed with earth often forms a noteworthy part of the material filling the kiva below the sand drift. And the assumption that a mass of earth was formerly packed around the vault of the roof making a level plaza, and that this slipped into the kiva when and as the roof fell, together with the especially vulnerable construction of the pilasters to which attention was called in the previous paper,[1] seems perfectly to account for the great uniformity in the appearance of the kiva sites in the undisturbed ruins. Dr. Fewkes' illuminating reconstructions at the Cliff Palace and at the Spruce Tree House on the Mesa Verde, may be cited in support of this assumption in our habitations of a flat plaza on top of the kiva at the sunny side of the pueblo, and in this case near the middens which form the burial mound.

The mode and apparent sequence of procedure in the construction of these dwellings seems clear. Placed as they regularly are on unincumbered earth sites, the impulse to uniformity in performance, method and result, so notable in folk in this stage of culture, was here unhindered as it could not be in the larger houses built on rock sites at the heads of gulches in recesses in the cliffs or in the open. One may conjecture that the first operation was the digging

[1] *American Anthropoligist*, vol. 16, p. 49.

of the hole for the kiva and the ditches at the bottom of which were the horizontal ventilator shaft, and in some case the passage to the pueblo. The roofs of these shafts, and tunnels were, in some instances at least, held up by cross pieces of wood, the remnants of which we found in place. In Ruin no. V (see figure 2) and in Ruin no. VII, however, the arched passage from the kiva to the pueblo seems to have been made by tunneling through the undisturbed earth. It is interesting to note as an advantage to the builders of these underground chambers and passages, that the deeper parts of the adobe soil in these regions is so firmly packed that it was not even necessary to plaster with fresh mud the tunnels to the pueblo, though this was sometimes done.

In our Kiva no. III, which was crude in construction, the earth sides of the lower circle before plastering were reinforced by driving into them at intervals of a few inches small bits of rock which gave a good holding surface.

The remarkable care with which the walls of the kivas were usually laid up of a single tier of stones set against the earth, and the heavier masonry of the pilasters was constructed, in both cases without purposed breaking of joints, is shown by the fact that in spite of the vicissitudes of disintegration and the work of the years, the walls of the kivas and most of the pilasters, except the fronts of their tops, had maintained their place and plumb; while in many the thick mass of superimposed layers of plastering was when we found it quite intact.

The burial mounds vary considerably in area but are seldom more than 40 or 50 feet across; and so far as my observations go are shallow and do not appear to have served for long periods either as refuse heaps or burial mounds. For I have never found great accumulations of debris, nor such differentiated layers of deposit as are sometimes to be found in other types of larger ruins farther south.

If, following the analogy of the still preserved roofs and tops of the prehistoric stone houses in some of the more or less protected cliff-cave dwellings of this region; and mindful of the fashion still

prevailing among the Pueblo Indians of today in their houses in the open; one assumes that these little box-like structures were flat at the top with an entrance from the roof and with the edges of the roof guarded by a tier or two of flat stones above the roof level for a parapet; it is evident that these habitations were very inconspicuous features in the landscape, gray and doorless and meagerly if at all windowed as their exterior was; against the dull backgrounds of the earth, the rocks and the foliage of this arid country.

In plate v, *a* is reproduced the photograph[1] of a model of such a pueblo with its plaza, which the writer has constructed from such data as these studies have afforded, and under the above assumption of its makers' kinship to the old cliff dweller and to the modern Pueblo Indian. A vertical section through another model is also shown in plate v, *b*.

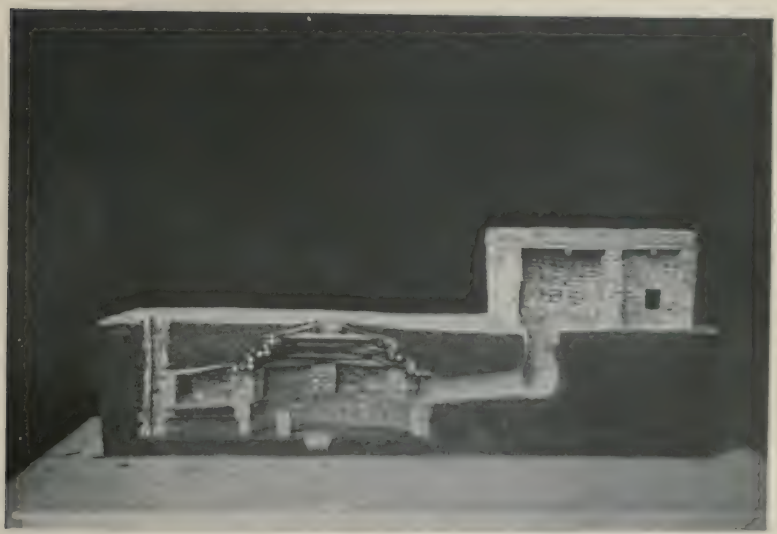
Turning to the articles of food and minor artifacts which our studies have disclosed, we find that these are mostly such as are of durable inorganic character, objects fashioned of clay or stone. Of foods we have found only corn and grass seed, so charred as to be invulnerable to the action of time and the weather.[2] Other organic objects were: fragments of charred timbers from the roofs; rotten and disintegrating remnants of roof timbers and of the wooden supports of underground tunnels and flues; the charred remains of a small flat-tipped wooden implement; a bundle of partly charred shreds of bark; a mass of black human hair; a small plaited ring.

That the reward of search for perishable objects should be so meager is not surprising when one considers how complete has been the exposure to the elements through a long period. The sites are always open, the amount of protective covering of stone, debris, soil, and sand drift is at best slight, and the climatic variations severe upon the great plateau. On the other hand the conditions in many of the cliff houses in these regions, whence a large part of our knowl-

[1] The photographs of these models, as of the minor artifacts illustrating this study, were made for me by my friend Dr. William P. Northrup.

[2] We were not able to identify any of the erstwhile farming fields in the vicinity of our ruins; nor did we make very particular search since most of the open country thereabouts is constantly remoulded by sand drift and mantled with sagebrush and grease wood.

a



b

PHOTOGRAPHS OF MODELS SHOWING A RESTORATION OF THE "UNIT TYPE" HABITATION.
A. IN PERSPECTIVE. B. IN NORTH AND SOUTH SECTION

a. In the court or plaza over the roof of the kiva south of the house, are seen the stone-edged openings of the ventilator and of the smoke hole (or possible entrance) over the fire pit. Stone slabs forming a probable mealing place are set near the house where in the Bug mesa ruin they were found. Notched timbers are placed as ladders to the roof and from here into the interior of the house.

b. This section shows many of the common structural features of these dwellings, including in the kiva, the ventilator, deep southern recess, deflector, fire pit, pilasters and banquette, vaulted timber roof resting upon the pilasters, the underground passage to the house with one of the small doorways of the latter between the rooms.

edge of the food, garments, utensils, and ceremonials of these early folk has been derived, is wholly different. In the cliff houses, entirely protected from the weather as objects of all kinds may be, the most delicate objects, fabrics, feathers, and the like, are often found in as perfect form as on the day of their abandonment. Even in the great open community houses, such as those on the Chaco and the related ruin at Aztec on the Animas, where the amount of covering debris is large and many rooms are still intact beneath, the preservation of delicate objects is remarkable. Thus it is that our meager contribution to the knowledge of many of the capacities and ways of the masters of the simple prehistoric ranch houses must be derived from an important but relatively limited group of the more durable minor artifacts.

The stone and bone implements which were found were of ordinary workmanship, some rude, some excellent. There were axes, pounding grinding and polishing stones; mullers, metates, and mortars; arrow and spear heads; stone scrapers (*tchampais*) and sandal lasts; small pendants; pieces of hematite, worked and unworked; bone awls and bone scrapers; deer-horn flint flakers of various forms and sizes. There were many unworked turkey and small mammal bones in nearly all the ruins. No specimens of marine shells were found; but several small fossil shells were scattered in the debris of some of the ruins. No metal or metal objects were found.

As to the kinds of pottery found little need be said in this summary, in addition to the details and illustrations elsewhere given of the individual ruins which we have examined, save to note that in form and decoration it conforms to the type found in many other ruins of the Mesa Verde district as defined by Fewkes.[1] Some of it is extremely crude in form, texture, and decoration; some is excellent. In some of the crude corrugated pots the fill of broken quartz is so coarse as to render them very rough and friable; but on the other hand some of the smooth ware ollas are fine in texture, excellent in temper, and are polished with the care which marks the highest technical skill in this form of prehistoric pottery. I have

[1] See references, p. 4.

never found the "life line"; nor have I seen depressions in the rounded bottoms of bowls or ollas.

In a mug which had been exposed to the intense heat of a house conflagration the handle had been detached, leaving a clean-cut hole near the rim and one below, showing that to secure a firm attachment of the handle a hole about one third of an inch in diameter had been cut through the already shaped body of the mug through which the clay cylinder which was to form the handle was inserted to be then flattened and smoothed out in the interior and shaped without.

The dippers found were mostly thick with square-edged rims; the latter, however, in many cases, as is common in this region, were beveled on the edge opposite the handle by scraping against the rock when long used for dipping water from the pools. Some of the dipper handles were flat and solid, but more were hollow cylinders, closed and narrowed a little at the distal end, where there was often some simple moulding of the clay to form small teat-like projections or crude suggestions of animal forms. Many of both the solid and hollow dipper handles were pierced with a single or double row of small holes or were decorated with stripes or cross bands of black.

Most of the corrugated pots were smoked on the outside. In a few some blunt-pointed hard object had been drawn across the coils on the outside, after the shaping of the pot, making shallow, incised lines and bands. We found none of the spiral or other figures which in this region are not infrequent on the outer surface of corrugated pots just below the rim. We found a few fragments of smooth ware ollas on whose surfaces rude geometrical figures had been incised in narrow shallow lines. In one specimen of smooth white ware rows of shallow punctate depressions on the surface in uniform parallel lines suggested the use of a roulette. We found only fragments of red ware bowls decorated with black.

Now on the basis of the study of seven ruins of the unit type in the northern San Juan district recorded in this and in the previous paper, one would seem to have in hand sufficient data to justify

some general statements as to the character of these early homes and the cultural status of their makers. For although only about one third of the district has been covered in the widely distributed examples selected for excavation, the uniformity in site grouping and appearance, of the undisturbed ruins of this type over the whole district, as determined by the writer's earlier reconnaissance; together with the almost complete similarity in structure of those which have been dug out, would seem to indicate unity in structural type. The sherds also, which owing to the uniform presence of a burial mound, even in the smaller and more primitive of them, as well as the many collections of whole pieces of pottery and other artifacts made by many random delvers in the burial mounds which the writer has had the opportunity of examining, suggest the uniformity of culture in these primitive house builders, over the whole northern San Juan district from Pine river westward to Grand gulch. Even the boulder sites, which are so common on the benches bordering many reaches of the San Juan river, the Mancos, the La Plata, the Animas and Pine river, may safely be presumed to conform to the others, showing as they do when sufficiently preserved, the characteristics of the associated house, kiva pit, and burial mounds.

Summary.—We may then venture to describe these little prehistoric dwelling places in the open country of the northern San Juan district, which conform to the unit type, and built on level or slightly sloping earth sites, as follows. They commonly consist of a square-cornered, flat-roofed, one-storied stone or stone and adobe house or pueblo; with usually one or two short rows of small rooms; sometimes with side wings, without doors in the outer walls but in the roofs, and facing southward. An underground passageway leads from the floor of one of the center rooms of the pueblo to the banquette level of a subterranean circular kiva either close to or a few feet southward.

The kiva, almost always more carefully constructed than is the pueblo, is usually, in part at least, stoned and plastered, with stone pilasters for the support of the roof, recesses, and banquettes between them, the southern banquette being usually the deeper.

There are niches or cubby holes in the northern wall beneath the banquette; a centrally placed fire pit in the plastered floor; a ventilator flue passing beneath the southern recesses at the floor level and rising to the surface of the ground directly outside of the southern kiva walls. A deflector is placed between the fire pit and the ventilator opening. A *sipapu*, or a depression in the floor which may represent this, is commonly present. On the top of the kiva was probably a small level plaza or court close to the southerly wall of the pueblo.

The best conception of the relationship of the kiva to the pueblo is derived from a vertical central north and south section such as is shown in the photo of the model (plate v). In such a section the southern deep recess seems to assume an exaggerated share in the subterranean space, since in fact it occupies only a short segment of the circumference of the kiva above the banquette.

Thus these small ruins, which over a large district we have found to be so uniform in structure and in the intimate relationship of the kiva to the connecting group of domiciliary rooms, belong in the middle period of pueblo development, as laid down by Fewkes.[1] This he believes followed a period in which the ceremonial structures—towers or kivas—and the secular living rooms were distinct; and was succeeded by a period which developed various forms of ceremonial chambers related to but not structurally connected with the domiciles, as is also the case in several modern pueblos.

The artifacts which these studies have disclosed in the small house ruins do not seem to be in any way different from those of the builders of the larger houses of various types in the Mesa Verde district.

A burial mound lies south or southerly, a few feet away from each pueblo or small congeries of pueblos. In these the usually flexed burials are sometimes with but more often without covering stone slabs. With the remaining bones, commonly much disintegrated pottery or other mortuary offerings may be found.

While, as has been said, these little ruins are often widely scat-

[1] Fewkes, "Archeological Investigations in New Mexico, Colorado, and Utah," *Smithsonian Miscellaneous Collections*, vol. 68, no. 1 (1917), p. 37.

tered over the summits of the uplands and through the valleys, both wide and narrow, in the northern San Juan district, they are more often in community groups upon favorable sites. This may be seen on the reconnaissance map of the San Juan watershed accompanying my first paper,[1] on which a single red spot in many instances represents a whole compact community of houses. In such communities one house is often larger than the others and stands commonly on the most commanding part of the site. This is the case in the group near Cortez in the Montezuma valley in which my first excavations were made.[2] Such a larger and more commanding house in the community was also at the top of the ridge at Bug point.

In the region which our excavations have covered, small ruins of the unit type are in part close to as well as widely scattered many miles away from the great community houses on Squaw, Bug, and Goodman points; and the less compact but still imposing groups at the Yellow Jacket spring on the line of the old Spanish trail; and many others at the heads of gulches or on commanding points on the Yellow Jacket drainage, as at the Cannonball, the Hawkberries, Ruin canyon, etc.

Similarly in the Montezuma valley, where some of our excavations of 1913 were made; in addition to the hundreds of small ruins of our type are the Buckhart ruin, sprawling over the rock escarpments of a small branch of the upper McElmo; and the great Aztec spring ruin at the eastern foot of Ute mountain. Among the gullies at the western base of the Mesa Verde; along the bottoms of the Mancos river, where it cuts through the rugged plateau; as well as over the sage, piñon and cedar-clad summit of the mesa, small stone heaps with their sunken kiva sites and their burial places are not far away from the great picturesque houses in the cliffs. The great cliff houses in Grand gulch, in Utah, and those along the western ridges of

[1] *American Anthropologist*, vol. 5 (April–June, 1903).

[2] In this larger and apparently two-storied house ruin, which has been much dug over, Mr. Husted, the proprietor of the ranch on which the group is located, informed me the interior door to one of the lower rooms was found walled up and the room contained a skeleton beside which were some excellent pieces of pottery. The finding of closed rooms in prehistoric pueblos used as mortuary chambers has been several times recorded.

Butler wash, look out upon many small ruins apparently of our type, which, except for their burial mounds, have as yet remained untouched.

While this study has been limited to the small house ruins of the unit type, it should be noted that all over this district larger ruins are to be found which show similar close relationship between circular kivas and domiciliary structures connected with them. Furthermore many of the larger complex ruins in this district are composed, in part at least, of a number of units; that is, a kiva with its associated secular rooms, crowded together upon irregular sites such as heads of gulches, mesa edges, cliff caverns, etc. In connection with his illuminating studies of the Cliff Palace and the Spruce Tree House on the Mesa Verde, Fewkes has called attention to these congeries of "units" as composing larger ruins.

This early American who built these primitive houses so strikingly alike over a large district in the northern San Juan watershed, and apparently in many places south of the river, was first of all a farmer and a hunter. But he was also an excellent mason, as good a carpenter as might be with rocks and fire for tools, and a skillful potter, in much of whose handiwork a genuine artistry finds quaint expression. The structure of his kivas shows that he was a devotee to religious ceremonial; that he had a heritage of tradition which he shared with the dwellers in the cliffs and other kindred folks who for some reason built bigger houses than he did in the open country and that linked him to the modern Pueblo Indian.

He set the lines of his houses and of his ceremonial structures according to the courses of the sun and the stars, and faithfully provided food and utensils for the welfare of his dead. With a ventilating system which would shame many modern house builders he freshened the air of his darksome chambers underground where he worked and played and kept in touch as his traditions bade him, with Unseen Powers which shaped each detail of his life. I guess he played and tinkered and gossipped on the flat roofs of his box-like houses overlooking his neighbors and his neighborhood, for that is what his surviving kinsmen do to-day at Zuñi, at Acoma, and in Tusayan, and in many other places. I know he must have

found snug comfort in winter on the little plaza in the sunny lee of his pueblo, for he was quite human and none too generously clad, for warm garments were hard to come by in those times and the winds are keen which sweep over the bleak reaches of the uplands in winter and down the valleys from the great mountains fringing the northern borders of this land. It is not likely that he wandered far from his home country, for one does not find among his scanty belongings much evidence of barter with folks of other regions.

Attention in this study is not concentrated upon a particular type of small habitations in the open country with the intent to differentiate, either in time or place or culture, between their makers and the builders of those other dwelling places of larger and more complex types, which are widely distributed in the same districts and often in close proximity. Whether the closely related people who build the small isolated houses with which this study deals, and the big communal dwellings in the same territory, occupied them and the region at the same time or whether one followed the other, and if so which were the pioneers, is still an open question not to be settled until many more careful studies of many more ruins of both types shall have been made.

Similarly, further studies must show whether the fashion of separate habitations for individual social units first found expression, as seems probable, in the scattered homesteads, to be later adapted to the exigencies of a closer communal life; or *vice versa*. So far as the studies of both types have gone, there is evidently a close relationship between the larger and the smaller forms, as well as between the artifacts which the excavations of both have disclosed. The motive for the different types of building seems, in part at least, to have been determined by the difference in site and some as yet undisclosed community requirements. To what extent the latter were of a defensive character is not altogether evident. But apparently protection against human enemies did not enter into the requirements of the time in the location and the making of our little flimsy scattered open country houses. Even the diminutive size of the houses and the inevitable mergence of their dull gray walls into the kindred shades of the earth, the rocks and the

foliage, would scarcely conceal them from the keen eyes of marauders armed with the acute vision of men schooled in the open.

So one may safely conjecture that these scattered unprotected farmer folk went about their tasks, practised their sports, and followed the lead of their dominating traditions, for a long time at least, quite unmolested. And while their houses, if snug, were undoubtedly stuffy, one may not forget that their lives were spent largely out of doors and in a land which now as then lends itself, austerely it is true, but still generously, to the love of living.

AN EARLY ACCOUNT OF THE CHOCTAW INDIANS

BY

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CONSIDERING the important part played by the Choctaw Indians in early Louisiana history it is surprising what slight attention they received from early French writers. In the classic works of Le Page du Pratz, Dumont de Montigny, and others, we have pretentious descriptions of the Natchez, and considerable accounts of many of the other leading tribes on and near the Mississippi. Bossu, writing somewhat later, furnishes a considerable description of the Alabama Indians about Ft. Toulouse. But up to the present time we know of no French writer who made the huge Choctaw nation a special object of attention. This was probably due partly to the fact that there was nothing peculiar or striking either in the social organization or the customs of these people, as was the case for instance with the Natchez, and partly to the common knowledge regarding them which soon came to be shared by the greater part of the French settlers of Louisiana. And as, in course of time, a great deal of Choctaw ethnology quietly passed out of sight, it passed at the same time out of record as something too well known to need attention or to require the services of an historian. Fortunately, however, there was at least one exception to this general neglect, and this exception furnishes the occasion for the present article.

In September, 1916, the writer visited Chicago for the purpose of examining the valuable collection of works and documents in the Edward E. Ayer collection in the Newberry Library, and among the important manuscripts gone over at that time, some of which have been noted elsewhere, was a French narrative of Louisiana such as appeared frequently during the earlier part of the eighteenth century. This is entitled "Relation de La Louisianne" and is a small bound manuscript written in a fine, clear hand. There is nothing

[1] Printed by permission of the Smithsonian Institution.

to show whether it is the original or only a copy, and there is no clew to its author except that on the back are printed the words "Relat de Kened." The first and last words appear to be cut off, the last being probably the name of the author. The "Relation" has 267 pages and is of value to the historian of Louisiana hardly less than to the ethnologist. That part dealing with the Choctaw occupies all of chapters VII and VIII, pages 118 to 165. Of course the information embodied in this narrative is by no means to be compared with one of our modern ethnological studies, but it contains many important and interesting facts which could not be recorded at the present day. The footnotes are all mine. I have not attempted to smooth out the grammar of the original except in the more important particulars.

The Chaquetas are a hundred leagues north of Mobile. There are about four thousand bearing arms. The French divide them into three cantons. The eastern is named Ougoula annalé.[1] The chief of this canton has the same prerogatives as the grand chief. That of the west is called Ougoula tanama.[2] That of the south is named Taboka.[3] It is there where the grand chief lives.

This nation is governed by a grand chief whose power is absolute only so far as he knows how to make use of his authority, but as disobedience is not punished among them, and they do not usually do what is recommended to them, except when they want to, it may be said that it is an ill-disciplined government. In each village, besides the chief and the war chief, there are two Tascamingoutchy[4] who are like lieutenants of the war chief, and a Tichou-mingo[5] who is like a major. It is he who arranges for all of the ceremonies, the feasts, and the dances. He acts as speaker for the chief, and makes the warriors and strangers smoke. These Tichou-mingo usually become village chiefs. They [the people] are divided into four orders, as follows. [The first are] the grand chiefs, village chiefs, and war chief; the second are the Atacoulitoupa or beloved

[1] Okla hąnali or Six towns.

[2] Ougoula is Okla; tanama perhaps from tanampi, to fight.

[3] Perhpas from tabókoa, noon, and hence the south.

[4] Tąska minkochi, "made a war chief."

[5] Tishu minko, servant chief.

men[1] (hommes de valleur); the third is composed of those whom they call simply tasca or warriors; the fourth and last is atac emittla.[2] They are those who have not struck blows or who have killed only a woman or a child.

This nation is warlike against similar people, and in the woods. The French always having needed to depend upon them in war, it has made them so insolent that they despise the French and would receive the English among them. They are much accustomed to receiving presents from the French, which formerly were very few, not reaching, then, a value of eight thousand *livres*, but which, increasing every year, amount at present to more than fifty thousand francs. They think that it is a right, that the French pay them for the lands which they occupy. It is this which they try to make them understand in the speeches which they make to the commandants of the posts where they go, saying:

Formerly our ancestors occupied the place where you[3] now live and came there to hunt; they have ceded it to you as to people who wished to be their friends, in consideration for which you have promised them a certain quantity of goods, and length of time has not cancelled the continuance of the gift, and of the friendship, which, having reigned between our ancestors and the French, reigns still between you and us. You know that every time you have asked us to take vengeance on your enemies who have insulted you, we have had pity, since, being few in numbers, you were unable to go to war, and that we, regarding you as our brothers, have left our wives, children, houses, villages, harvests, and periods of hunting to attack your enemies and stain our arms with their blood; that we have often lost our people there. You know that many times on returning from war we have taken credit for the goods that you have promised us, gained at the price of our blood, because they had not yet arrived by vessel from France. You know that the English are always at our doors importuning us to make an alliance with them, and sell them our deerskins at fairer prices than you offer. We have hopes then that in consideration of all these things you will look with pity on us and will share with us as your brothers in order that we may return to our village loaded with the presents you shall have given us.

Here are almost the exact words of one of their speeches, and the others do not differ much from it. They often repeat the same

[1] Hatak holitopa, "holy or beloved men."

[2] From hatak, "man" and perhaps imatali, "supporting."

[3] Throughout this speech the familiar form of the pronoun of the second person singular is employed.

thing, and in making a speech they usually consume two hours in talking.

When a band reaches Mobile in the time when presents are given out, which is usually the month of March or April, they stop three leagues[1] from the town, and send a messenger to inform the commandant of their arrival, and ask for bread and brandy. What they need is sent to them in proportion to their numbers, and the next day they arrive in ceremonial costume, which consists in a cloak without lining, a very dirty shirt, and a bad breechclout: the greater part have only one skin, of deer, bear, or bison, on the body. In this garb the interpreter conducts them to the commandant, where they begin by shaking his hand one after the other. You may believe that it tires him when the band is large. They smoke and then give [the pipe] to the commandant and the officers around him to smoke, as a sign of peace, after which they make the speech. Then they are sent back into the woods, their arms are mended, they are fed until they leave, and presents are made them. All of these irruptions (dessentes) of the savages cost the commandant infinitely for he has them very often at his table, or such [Indians] as come in while he is eating, to whom he is obliged to give food and drink by way of entertainment. The union having been placed on this footing for many years, scarcely are they gone when others come and this train (trin) usually continues three weeks, sometimes six. They are fed during this time with rice, corn, potatoes, a little bread, and sometimes brandy.

When a Frenchman wishes to go to trade among them, he usually chooses the time when they return with their presents. He asks of the chief of the band the number of savages he needs to carry his goods, for they go by land and every evening he must lie down under the open sky and on the earth. His entire bed consists in a bear skin and a small blanket. Meat is had on the route when the savages can kill anything; otherwise they live on corn (bled de turquie), which is called maize, which is boiled in water. When one has reached the village he is conducted to the house of the chief, where, having entered without uttering a word, he is seated on a cane bed

[1] Spelled *lieux*.

raised about three or four feet above the ground, for fear of the fleas. Then they throw you a pipe called calumet with the pouch full of tobacco which you smoke. It is to be noticed that all this is done without speaking, after which the chief says to you "You are come then?" Having answered that he has, one tells him the object of his journey and the kind of merchandise which he has brought to sell to his warriors. The next day he (the chief) informs all the people of the arrival of the Frenchman at his house, what he has brought, and what he asks for it. Each one comes to his shop, and takes away his goods, and when he (the trader) desires to return he informs the chief, who has the payments which he has agreed upon with his warriors brought to him. He again asks for porters and repairs to the French village. These journeys are usually of two or three months' duration, and two hundred per cent. is made by them; but it is necessary to know their language well.

Their house is nothing else than a cabin made of pieces of wood of the size of the leg, buried in the earth, and fastened together with *lianas*, which are very flexible bands. These cabins are surrounded with mud walls without window; the door is only from three to four feet in height. They are covered with bark of the cypress or the pine. A hole is left at the top of each gable-end to let the smoke out, for they make their fires in the middle of the cabins, which are a gunshot distance from each other. The inside is surrounded with cane beds raised from three to four feet from the ground on account of the fleas which exist there in quantities, because of the dirt. When they are lying down the savages never get up to make water but let it run through the canes of their bed. When lying down they have a skin of a deer or bear under them and a skin of a bison or a blanket above. These beds serve them as table and chair. They have by way of furniture only an earthen pot in which to cook their food, some earthen pans for the same purpose, and some fanners or sieves and hampers to prepare their corn, which is their usual nourishment. They pound it in a wooden crusher (pile) or mortar, which they make out of the trunk of a tree, hollowed by means of burning embers. The pestle belonging to it is sometimes ten feet long and as small around as the arm. The upper end is an un-

shaped mass which serves to weigh it down and to give force to this pestle in falling back, in order to crush the corn more easily. After it is thus crushed they sift it in order to separate the finer part. They boil the coarser in a great skin which holds about three or four *sceau* of water, and mix it sometimes with pumpkins, or beans, or bean leaves. When this stew is almost cooked they throw into it the finest of the corn which they had reserved to thicken the water, and by way of seasoning they have a pot hung in the air in which are ashes of corn silk, beanpods, or finally oak ashes, on which having thrown water they take the lye which has fallen into a vessel provided underneath, and with it season their stew which is called *sagamité*. This serves as their principal food, and as well that of the French who are in the colony who have not the means of living otherwise.

They sometimes make bread without lye, but rarely, because that consumes too much corn, and it is difficult to make, since they reduce it to flour only with the strength of their arms; after which it is kneaded or they boil it in water, or wrap it in leaves and cook it in the ashes, or finally having flattened the paste to the thickness of two crowns (ecus), and the diameter of the two hands, they cook it on a piece of a pot on the embers. They also eat it with acorns. After having reduced the acorns to flour they put them in a cane sieve placed near the bank of a stream, and from time to time throw water upon them. By means of this lye they cause it to lose its bitterness, after which they put the paste around a piece of wood which they cook in the fire. When they have meat they boil it in water, however dirty it is, without washing it, saying that that would make it lose its flavor. When it is cooked they sometimes put some of the acorn flour into the broth. They also cook unpounded corn with their meat, and when it is dry they pound it and reduce it to lint (charpie). They mix it in boiling with this corn. That has no taste and one must be a savage to eat it.

While the corn is green is the time when they hold the most feasts and they prepare it in different ways. First they roast it in the fire and eat it so; many French eat it thus. When it is very tender they pound it and make porridge of it, but the most esteemed

among them is the cold meal. It is corn, considerably mature, which they boil, then roast to dry it, and then they pound it; and this flour has the same effect in cold water as wheat flour put into hot water over the fire and has a taste sufficiently agreeable; the French eat it with milk. They also have a species of corn which is smaller than the other and which comes to maturity in three months. That they dry and then without pounding it boil it with meat. This little corn, boiled with a turkey or some pieces of fat meat, is a favorite dish with them.

They are very dirty in their houses, in their drink and food, as upon themselves. One seldom sees among them a crooked or humpbacked person. They have very good figures. Their women are very ugly; they are like slaves to their husbands. They do everything in the house, work the ground, sow, and harvest the crop. The men sometimes aid them at a distance from the town, but never go for water or fire as soon as they are made warriors, considering that that would dishonor them. They occupy themselves only with hunting. They are very lazy and cunning. They cherish a desire for revenge for a generation. The grandson will avenge an insult made to his great-grandfather by killing one of the descendants of the one who gave the blow. They bring up their children in this spirit of revenge. With all that they never become angry, love much, and will sacrifice themselves for their friends, are very patient in suffering, and endure the death penalty without complaint. On the contrary they sing up to the last groan.

When a woman finds herself inconvenienced in the accustomed manner she immediately leaves the house, and goes a certain distance from it to a retired place. She lights a fire there with flint and steel (briquet). They say that they must use new fire, and if they took some of that of the house, the house would be polluted, and the woman would die from the strength of the sickness which would be increased. The men do not live with their wives while they are in this condition. They [the women] hide themselves from the sight of the men: the husbands then get their own food or go to the homes of their neighbors.

One day I found myself at the house of a savage who had gone hunting for me the evening before. On awakening next morning, not finding the woman of the house, and seeing a fire at a distance I went to find her. I was then ignorant of this ceremony and having begged her to make me some porridge of little grain, it was only by means of entreaties that I obtained my request. As I was beginning to eat her husband arrived. I asked him if he wanted some, and having answered me that he did, he began to eat with me, but when the plate was half emptied, it occurred to him to ask me who had prepared it; it is to be remarked that he had recognized the cause of his wife's absence through some articles which were missing from the house; when I replied that it was his wife who had been my cook, he was at once seized with sickness and went to the door to vomit. Then, reëntering and looking into the dish, he noticed some red things in the porridge, which were nothing else than the skin of the corn, some grains of which are red. He said to me: "How have you the courage to eat of this stew? Do you not see the blood in it?" Then he began vomiting again and continued until he had vomited up all that he had eaten; and his imagination was so strongly affected that he was sick on account of it for some days afterward. It is a thing which they take such great care to observe as to absent themselves during that time, and to bathe well before reëntering the house.

When a youth wishes to marry, he goes to find the father and the mother of the girl whom he desires. After having made his request he throws before the mother some strings of glass beads, and a breechclout before the father. If they take the presents it is a sign of their consent, and then the youth leads the girl away to his home without other ceremony. From this moment the mother can no longer appear before her son-in-law; if they are obliged to remain in the same room they make a little partition between them for fear lest they see each other. When a man's wife is pregnant and near the time of delivery, so long as she is in travail he eats only in the evening after sunset, and if the child is a girl he observes this fast eight days longer. They are very jealous. When they find their wives *flagrante delicto*, they complain to her parents re-

garding what they had given for her.[1] They cut off her hair and repudiate her. Sometimes the village takes cognizance of the case, seizes the woman and her lover, and gives them a hundred blows with sticks. Often they will cut off their nose and ears. This last is not done any more on account of the deformity which it causes, besides the fact that they often die from the effects. Formerly when they caught a woman in a fault they tied her to four stakes, and abandoned her to three or four hundred young people, of whom she died. When a woman is abandoned by her husband she is proclaimed to be what she is and then he who wishes can take her, at least unless someone adopts her as his wife, which is unusual, unless it be a man of another nation who takes her and carries her off with him. Otherwise she is obliged to go along the streams in the dusk of the evening singing songs belonging to this usage and in a peculiar tone of voice, hearing which if any young person has use for her he goes to find her, leading her away under the shelter of his blanket in order to let it be seen that she is under his protection. He keeps her as long as he wishes and feeds her; but when he is tired of her, she is obliged to begin her wanderings again in order to live. Even though she wished to change her life her parents do not take her back, not daring to trust her promises. It is necessary that it should be a single man who takes her home to make her his wife in order that she be protected from insult. They may abandon their wives whenever they wish, and take many of them at a time. I saw one who had three sisters. When they marry a second time they take the sister of the dead wife, if she had one, otherwise a woman of the family.

They never whip their children. They live in a friendly way. If one comes to see them they immediately offer him food, so that if a man enters thirty houses in a day he eats thirty meals. They are very temperate.

They[2] have no religion. They recognize only the devil, and those among them who invoke him are called jugglers. These are usually doctors. These persons have much to fear when they undertake

[1] The manuscript has "une p . . . " here as if something had been omitted.

[2] Chapter VIII begins here.

the case of a sick person who is a chief, for if he dies after they have conjured, his relatives say that he has bewitched him, and if he escapes after he has been condemned to death, they say that he had bewitched him and that fate has erred; so in all ways he runs risk of being killed. When there is a sick person among them they have the doctor come to the place where he is, who, after having conjured or demanded of their spirit if the sick person will get well, bleeds him with a piece of flint. Eight or ten incisions are made in the skin in a space of the size of a crown (ecu), as when one cups, over which they place one end of a pierced horn and suck it until the horn is full of blood. As these jugglers sometimes wish to hide their ignorance they say that someone has thrown a spell over them [the patients] and then they adroitly put some bison wool or a little piece of wood into the bottom of the horn, and after having sucked the sick man and poured out the blood which is in the horn, they show this wood or bison wool to the parents of the sick man, which they make them believe is a charm; then this juggler passes as a very wise man.

It is certain that these jugglers speak to the devil. I have seen a number of examples of it. I will cite three to you. One day, arriving May third at the house of a man named Fine Teeth, chief of the Naniabas,[1] returning from the Chicachas and being in need of tobacco, I asked some of this chief, who hunted in his chest where he had placed three twists in order to give me some, but could not find them. He thought it was I or some one of the French whom I had with me who had hidden it from him, but when he had learned that it was not, I saw him dress and daub himself as if he were going to a dance, after which, having gone to an open space a gunshot distant from the house, we saw him fill his pipe, strike the flint, light it, and smoke it with many gesticulations, as if he were disputing with someone. When he had smoked it half up it seemed to us that he gave it to someone else to smoke, without, however, our seeing anyone, except that he held his pipe at a distance from himself, and the smoke which came out in puffs (peletons) as if

[1] A small tribe connected with the Choctaw, but living apart from them at the junction of the Alabama and Tombigbee rivers.

someone smoked it. He returned to us immediately and told us, all of a sweat, that he knew who had taken it, and continuing on toward a cabin opposite his own, whither I followed him, he sprang at the throat of a savage, demanding of him the three twists of tobacco which he had taken from him at such an hour in such a manner, in short explaining to him the method which he had employed in accomplishing his theft. The poor savage, all of a tremble, admitted his crime and returned to him his tobacco.

The French, curious regarding his skill, went to find him, and begged him, meditating recompense, to make the otter dance for them. He took his tobacco-pouch which was an otter skin in which he kept his pipe and his tobacco, which he threw into the middle of an open place where the people were assembled to judge of his skill: after he had uttered a number of badly articulated words and thrown himself repeatedly into the fire, from which he came out in a perspiration, and without being burned, this skin was seen to swell out, fill with flesh, and come to life, and to run between the legs of the Frenchmen, some of whom in the company having carressed it and felt of it, found that it was like a true otter. When each one was satisfied it returned to the same place where it had come to life and was seen to diminish in size and return to the form which it had before.

When we were surrounded by the Spaniards in Dauphin island, and were expecting help from France from day to day, we wished to know whether it was on the point of arriving, which could only be known by means of the savages whom we had with us. They were then made to conjure, and having done this they reported that five vessels would come the next day, three of which were large and two smaller, that they were loaded with soldiers, that one of the little ones would not arrive as soon as the others, because it was separated and was still a long way off, but that all would have arrived the next day toward evening. This actually took place, for the next day at eight in the morning the first vessel was discovered, and about three or four in the afternoon four anchored at Dauphin island, but the fifth did not come in until the next day.

They take medicine often from their chief. They take medicines

made of herbs and roots of trees boiled together, which they drink, and to make themselves vomit they run feathers down their throats. Sometimes they make themselves sweat. For this purpose they make a little cabin about four feet in height and eight in diameter, which they cover with bison skin and blankets. They put inside five or six red-hot balls, on which from time to time they throw a little water to stimulate the heat. They enclose in this little space as many as seven persons, and after they have sweat for about a half or three-quarters of an hour they get out of this hole quickly and go with precipitation to throw themselves into the freshest water. I am sure that this remedy has never been commanded by any descendant of Æsculapius. Also it is true that the majority of these people suffer from debility (en langueur) with pains over the entire body.

When a sick person is near death the doctor leaves him and informs his relatives of it, assuring them that he cannot escape. Then the women come to wash his body, paint him, daub his face, dress him in all of the finest clothes which he had, and lie on the ground in the open space in front of his door. His wife lies on his stomach weeping, with his nearest relatives who also lie upon him and stifle him. They ask him why it is that he hungers to die, if he has lacked anything, if his wife did not love him enough, if he was not well respected in his village; in fact this unfortunate patient is obliged to die in spite of himself. Those who have lain down on him cry at the top of their lungs, imagining that he does not hear, since he does not reply. Besides that there are the hired criers who during this time come to weep or rather howl to music beside the body, before and after his death. As soon as he is dead his relatives erect a kind of cabin in the shape of a coffin, directly opposite his door six feet from the ground on six stakes, surrounded by a mud wall, and covered with bark in which they enclose this body all dressed, and which they cover with a blanket. They place food and drink beside him, giving him a change of shoes, his gun, powder, and balls. They say that it is because he is going into another country, and it is right that he have everything he needs in his journey. They believe that the warriors go to make

war in the other world, and that everyone there performs the same acts that he did in this. The body rests in this five or six months, until they think that it is rotted, which makes a terrible stench (infection) in the house. After some time all the relatives assemble ceremoniously and the *femme de valleur* of the village who has for her function (distrique) to strip off the flesh from the bones of the dead, comes to take off the flesh from this body, cleans the bones well, and places them in a very clean cane hamper, which they enclose in linen or cloth. They throw the flesh into a field, and this same flesh stripper, without washing her hands, comes to serve food to the assembly. This woman is very much honored in the village. After the repast they go singing and howling to carry the bones into the charnel-house of the canton which is a cabin with only one covering in which these hampers are placed in a row on poles. The same ceremony is performed over chiefs except that instead of putting the bones in hampers they are placed in chests locked with a key in the charnel-house of the chiefs.

When any of their enemies has declared war on them, they take counsel together over the affront which they have received, and after having resolved to make war on the nation by which they have been insulted, they begin the war dance. This commonly lasts eight days, and serves to encourage each one of the warriors who scarcely eat at all during this time, and who make libations of the juice of herbs which the medicine-man gives them, and with which they rub themselves, which has the virtue they say of giving them strength and courage, an invaluable herb if it were known in Europe. After this they set out to war. On the way, when they have to light a fire in order to cook food, they usually light it in a little valley for fear of being discovered by some party, for in that case the party will follow them until it has found a good opportunity to rush upon them. They never attack their enemies when they are awake; but in the evening, when they have discovered the place where they intend to pass the night, they try to get as close to them as they can, and, as the ground in the woods is covered with dry leaves which make a noise in walking, they have patience enough to remove them, one by one, with their toes, of which they make use

as of the hand, and if unfortunately they break some small branches, they immediately mimic the cry of certain birds which they imitate very well, in order to have it thought that it is this bird which has made the noise; if they perceive their enemy asleep, especially just at daybreak, they utter the death cry, and on the instant all shoot at once, each on his man, and they spring upon them war club in hand in order to finish those who are only wounded, from whom they carry away the scalps. If they have time they strip them and return to their village, within sight of which they utter the cry of warriors who have struck a blow, and who bring scalps. Each one [in the village] comes before them ceremoniously and they are led into the square in the same manner. They engage in dances as a sign of rejoicing over their victory and if any of the party has a child or nephew who has not yet taken part in such a triumph, he shares half of the scalp he has taken with him and has him received as a warrior. The ceremony is that the one who undergoes it suffers two hundred blows of a neck-band, which is a piece of hide five or six fathoms long, of the breadth of a finger, doubled many times, with which the warriors strike him full arm blows in turn on his back and on his belly, in order to make him understand that a warrior must endure everything patiently, even when he is taken by the enemy, and sing while they make him suffer and die. He must suffer these blows while singing, for if he should weep he would never be received and would pass as a woman, and unworthy of being admitted into the body of warriors. When they hold these ceremonial dances, each wears on his head a crown made of a piece of otter skin to which are fastened as many broken white feathers as they have killed men in their lives. Each family has its quarterings tattooed on the stomach and on the arms. They also put them on the handles of their war clubs, and when they wish to meet in the woods they make a mark on the trees, where they put their arms, by which the one who has made the mark is known, the trail he has taken, and where he has gone.

When they capture any young people, girls, women, or young boys alive, they carry them to their villages and make slaves of them. There are nations which adopt them as their dogs; then

they make them perform all the functions of a dog, guard the doors, growl when anyone enters or goes out, eat the leavings of the dishes, and gnaw the bones. When they are able to bring home prisoners, they have them burned at their villages, and it is a great joy to them when that happens.

When the French came among them they were willing to eat neither hens nor swine "because," said they, "these animals eat filth;" but they have accustomed themselves to it with the French, and eat all of their stews. When they wish to feast their friends they kill a dog, of which they have quantities, and serve it to them.

When they have no flint and steel (batte feu) in the woods and wish to light a fire, they make it easily by the contact of two pieces of wood which they rub rapidly against each other and make it catch on tinder which is near by. This tinder is made of fungi which grow on oaks.

When they have promised to conclude a peace five or six leading men of the nation come, bearing a calumet or pipe made of a stone, red like coral, which is found in rocks in the Illinois country.[1] This calumet has a stem about two or three feet in length surrounded by red feathers artistically worked, and from which hangs eight or ten black and white feathers. This serves them as a war standard, as a seal in alliances, as a mark of the continuation of faithfulness among friends, and as a sign of war with those with whom they wish to break. It is true that there is one which is the calumet of peace and another that of war. They are both made similarly. When they have concluded the peace the master of ceremonies lights this calumet and has all those who are in the assembly smoke two or three whiffs. Then the treaty is concluded and inviolable. They deliver this calumet to the chief with whom they make the contract which is as a hostage of their good faith, and the fidelity with which they wish to observe the articles on which they have agreed.

They do not make any curious work except their calumets, of which I have just spoken, and some articles of bison wool which the women spin, of which they make garters which they tint with different colors which never change. They also make a tissue,

[1] Probably catlinite.

partly of this wool, and partly of fibre from a very strong herb which they spin. This tissue is double like the two-sided handkerchiefs and thick as canvas, half an ell wide and three quarters long. That serves them as a skirt. They also make cane hampers of different colors, very pretty.

They are very lazy by nature, a much longer time lying down than standing, very great gamblers in a ball game which is like the long racket [game]. They place about twenty of one village against as many of another, and put up wagers against each other to very considerable amounts for them. They wager a new gun against an old one which is not worth anything, as readily as if it were good, and they give as a reason that if they are going to win they will win as well against a bad article as against a good one, and that they would rather bet against something than not bet at all. They also have a game with four pieces of cane. When they are very much excited they wager all that they have, and, when they have lost all, they wager their wives for a certain time, and after that wager themselves for a limited time.

They count by nights, and when they wish to play with another village, they send a deputy, who carries the word, and who delivers to the chief a number of little sticks. Every day one is thrown away, and the last which remains shows that the next day is the day chosen.[1]

They have dances among them accompanied by feasts, which are almost alike. Only the names differ; as the dance of the turkey, bison, bear, alligator. In this last they have masks made like the head of this animal, one or two disguising themselves thus, while five or six others take masks of different animals which the alligator commonly eats, and then they make a thousand grotesque antics. [Others are] the dance of the bustard, of the small corn, the war dance, and the dance of the young people, which is danced no longer, the French having made them conceive too great horror for it. When they have these dances, they begin about two hours after midday. They are painted; they put on their finest clothing, and

[1] According to the writer's experience the day chosen is that on which only one stick remains.

make a belt of about forty pot-metal bells as big as the fist. Others put on little bells (clocettes), and if they have [big] bells (cloches), and are able to carry them, they take them to these dances, loving the noise extraordinarily. They have a rattle (chichiquoüa) in the hand, or a war club, or a pistol. They dance around a drummer who has in his hand only one drumstick, with which he strikes a deerskin which is stretched over an earthen pot or over a kettle. They accompany this sort of noise with a song of five or six words which they repeat continually. These dances last until day, or until they go to sleep. They have knowledge of very curious simples.

They believe that there are ghosts and tell many stories on this subject which are improbable. They say that these ghosts (or apparitions) are of people who are dead and have not been given certain effects on dying of which they had need in the other world—as those who are drowned or killed in war—and which they again come to seek.

Their country is very beautiful, not so well provided with woods as that on the shore of the ocean. There are very large plains cut up by little streams which water them: in these plains for the pasture of cattle is excellent grass which grows to the height of a man. There is only one river which passes near this nation, at a village named Youanny, and it can be ascended only when the water is half up, because when it is entirely up the current is too rapid and when it is way down there is not enough water to enable boats to pass. It discharges itself into the river of the Pascagoulas, which empties itself into the sea opposite the Isle Ronde eight leagues from Biloxy. It is by that that the goods are carried to the detachment which is at Youanny. It is only a few years ago since one [detachment] has been located there, and because the savages had asked to have Frenchmen among them; they wished also to have a warehouse among them, giving as their reason the difficulty of carrying their deerskins to Mobile, or to New Orleans, and the fact that the ease of finding goods at home gave them courage to devote themselves more willingly to the chase. There is also a reason which ought to be added to this. It is that the facility which they would have in finding goods in their villages, would prevent them from carrying

theirs to other nations, for receiving them from them, and would attach them so much the more to the French. But it would be necessary also that these stores never lack merchandise, which happens often on account of the delay of vessels. It has been desired to give the exclusive privilege of this trade to three or four persons, as is done in Canada, so that only a certain number go to trade with the savages, on account of the permission which they receive, but the colony of Louisiana is not sufficiently well established to do the same. There are a number of people not in a condition to follow any craft, not knowing any, and not in a position to work the soil, not having the strength or the means of having negroes, but who live by means of trade. On their return from the savages they scatter in the town their peltries or the commodities which they bring back in payment to those from whom they have borrowed that by means of which they have carried on their trade; this causes each one to feel (share in) this commerce. Instead of allowing this to belong exclusively to three or four persons who are enriched while the others die of hunger within a settlement, one ought rather to consider the general than the particular good.

The country of the Chiquachas (Chickasaw) is better provided with plains than that of the Chaquetas and the land is more beautiful, the soil much better. It is also colder. The more one ascends into the country, the more beautiful, genial (gratieux), fecund, and suitable for building towns one finds it. There are mountains of solid stone. There are all kinds of woods to use in building. But the river of Mobile does not extend as far as the [Chickasaw] village.

When the Chiquachas or Chaquetas wish to bring something of the product of their hunting to Mobile in winter they make a raft, place themselves and their goods upon it, and let it drift with the current which brings them to the villages of the savages near the French, where, having sold their goods, they return home by land on foot, although they have many horses, almost all English or Spanish.

As the English carry all of their goods there on horses, the [Indians] often steal them from them and keep them. So far as the Chaquetas are concerned the greater part of those which they have

come from the French. In the last war with the Natchés they had themselves given a mare for each slave, French and black, which they recaptured. It is this which provided them with horses, and soon they were able to sell to the French. They let them live in the woods, and when they have need of them they go to hunt for them. I have noticed that animals of this kind, accustomed to live in the woods, decline visibly when one wishes to keep them at home. It is true that they are not fed at all as in Europe and they are not curried either. They would become very dear if one wanted to meet the expense of having them the year round at his home, there not being sufficient forage to keep them a long time. They are very lively when coming out of the woods and those who ride them go at breakneck speed. The women and the girls ride naturally on horseback in all the islands like the men. As horses are not numerous they make use of cattle for the cart and for the plows.

NAMES OF THE CHAQUETA VILLAGES	NUMBER OF MEN
Those of the east number six villages.	
Chicachae	150
Osquæ alagna	400
Tala	60
Nachoubaoüenya	40
Bouctouloutchy	30
Youanny	30
Those of the south number four villages.	
Conchats	150
Yanabé	100
Oqué loüsa	80
Coït chitou	80
This name means "a great league"; they say that formerly this village was a great league in circuit. It is there where the grand chief lives.	
Those of the west number 35 villages.	
Bouctoucoulou	60
The one who is to succeed to the crown is always chief of this village, and the grand chief lives there also, very often.	
Pinté	50
Abissa	40
Boucfalaya	70
Stéchipouta	40
Filitamon	60
Conchaboulоucta	100
Louscouchetacanlé	50
Ectchanqué	30
Ougoulabalbaa	100
Oqué oülloü	60
Mongoulacha	150
Otouc falayá	100
Boucfouca	80
Castacha	80
Yachou	40
Abeca	200
Cafétalaya	70
Outapacha	40
Toüalé	40
Achouqouma	30
Bisacha	80
Scanapa, village of the chief	30
Ebitoupougoula	60
Bouctoucoüloü	90
Abeca	60

Names of Chaqueta Villages	Number of Men
Oulitacha	40
Loucféatá	50
Mongoulacha	60
Yachoü or Achouq loüá	70
Itéopchaqüo	100
Osapaissa	50
Ouatonaoülá	80
Epitoupougoula	80
Ougoulatanap	150

This village is near the Chiquachas on the trail from the Alibamons and has a fort, because these two nations are very often at war together.

There are, as you see, many of the same name. Besides these forty-five villages there are many little ones whose names I do not know, which have, however, their own chiefs like the big ones. But as these vllages are very remote and very small the French have scarcely any dealings with them, and have knowledge of them only when the savages speak of them themselves. They report that besides among them they have sometimes seen wandering savages pass; they name them so because those people do not make villages at all, and in consequence neither plant nor sow, and live only on meat; they follow the herds of bison, and these animals serve them as food. This makes them change their abode as many times as they change it themselves. At night they sleep in trees for fear of venomous serpents or beasts. These savages take on the appearance of other creatures whose lives resemble theirs.

Bureau of American Ethnology,
Washington, D. C.

NOTES ON SOME BUSHMAN IMPLEMENTS

BY

BENE VAN RIPPEN

NOTES ON SOME BUSHMAN IMPLEMENTS[1]

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THE Bushmen implements described and portrayed in these notes were collected in South Africa during a visit made in 1917. It is the writer's intent to enlarge this collection at the earliest possible opportunity, as the Bushman material is rapidly becoming extinct, and whatever is still to be gathered is difficult to obtain.

Many implements could have been obtained which were made by Bushmen, but which were not those used by them originally as far as I know. They include carved walking sticks, carved wooden household dishes, pots and pans, large and small spoons, iron assegais, knob-kerries and many others of Bantu origin and design. They may be interesting to show the manual dexterity of a vanishing race but are worthless as ethnological specimens.

A prominent Bushman authority traveled through the Kalahari from 1905–1907, and collected ninety-one Bushman implements of different descriptions, and donated them to one of the larger museums in Europe. The writer feels free to challenge the correctness of the statement that they are all "Bushman implements."

The "Tikoe" or t''koe

There is probably no implement with which we associate the Bushmen as much as the digging-stick and stone or "kibi." Everyone in South Africa knows these stones which are familiar objects in the country. The Boers use them, suspended from a rope as weights, to keep the cattle gates closed. They are also placed on the floor against the front door to prevent it from closing. Stone B in plate VI shows a flat surface around the perforation caused by its having been used for that purpose.

That this type of stone was used by the Bushmen is beyond

[1] These are now in the Peabody Museum of Archaeology Harvard University.

question. They are represented in their paintings, in their folk-lore,[1] and were seen many times in actual use by them (fig. 18). But it is an open question whether all perforated stones are of Bushman origin.

Dr. Peringue, director of the South African Museum, at Cape Town, when on a visit to a Bushman family, threw one of these stones in front of an old Bushman asking him what it was and for

FIG. 18.—A Bushman woman using a digging stick or "kibi." From W. H. I. Bleek. Bushman Folklore. (London, 1911), p. 326.

what it was used. The old man took a stick, placed a horn at the lower end of it and pushing the stick through the perforation said that this was the way it was formerly used to dig roots. The photograph shows a Bushwoman using such a digging-stick. Bleek[2] thinks it probable that the kibi was used only by the women and not by the men, in which he is corroborated by Dornan.[3]

[1] Bleek, p. 361. A bibliography will be found on page 96.

[2] *Ibid.*, p. 361.

[3] Dornan, p. 49.

STONES: B, C, AND D ARE FROM THE ORANGE FREE STATE; E, FROM WESTERN TRANSVAAL; F, FROM CAPE COLONY; A, G AND H ARE FROM THE LYDENBURG DISTRICT, TRANSVAAL

Stones B, C, D, E, and F plate VI are what may be called typical Bushman stones. These types have a general similarity in size, shape, weight, and diameter of the perforation. They are more or less spherical in outline, although the horizontal diameter exceeds the vertical one. Their workmanship is very good as a rule. B, C, and D show distinct usage at the inner surface of the perforation, which is slightly constricted at its centre.

Stones A, G, and H are entirely different from the Bushman type, first in size, second in weight, and third in the shape of the perforation, which is very much constricted at the center, contrary to the Bushman type, which is only slightly so, particularly A and H which can hardly be considered Bushman stones. It would be impractical and wholly unnecessary to carry such large and heavy stones, weighing up to fifteen pounds, on their nomadic wanderings. This may be substantiated by a statement of Miss Lemué, quoted by Stow,[1] saying: "The t"koe was such a valuable article with the Bushmen that it was never left behind or thrown away."

That all perforated stones are not used for the digging-stick may possibly be shown in stone D, which having a typical Bushman outline and workmanship can, on account of its small weight, not be considered a valuable adjunct as such.

But if these specimens, both light and heavy ones, were not digging-stick stones and not used by Bushmen, by whom and for what purpose were they used? This is a question difficult to answer. The writer was informed that some of the Bantus tie them to the tail of an ox to keep him from running away.

Some of the Transvaal natives on the Hoogveld use small perforated stones at the present time on a walking stick, which is carried upright in the hand in the characteristic native fashion. Both of these usages may be customs, recently adopted, after finding these stones about in great numbers. The stones illustrated, ranging in weight from two to fifteen pounds, leave a grave doubt as to their being used for one purpose.

The writer was unable to ascertain if any perforated stones were ever found in kitchen middens or Bushman graves. One stone,

[1] Stow, p. 67.

according to Barber,[1] was found in a Kimberley diamond mine at a depth of forty feet. This observer does not believe the Bushman made the t''koe, although they used them. Continuing, he says:

The idle, erratic Bushman, with his wandering thriftless habits, living upon roots, or passing through the country in search of game, ostrich eggs, etc., or following the locust swarms for weeks together, living with them, and sleeping where they sleep, day after day, through storm and sunshine, was not a man to devote hours of labor to this work, neither would he carry them about. However, their great antiquity cannot be doubted, judged by the places where they are found.

Passarge[2] substantiates this in part by saying:

The rough, wandering life does not allow but the simplest and few light household articles easy of transportation.

Staudinger[3] discussing the perforated stones contends that they have nothing to do with the Kibi theory, and remarks:

Not all perforated large and small stones were digging-stick stones, as may be seen in the different Bushmen paintings. In the Nile district north of Victoria Nyanza, perforated stones were found to be used for clubs. A large perforated stone was collected in the interior of the Kamerun.

Theal[4] says:

There was one stone implement on which much time and labor was spent. When the Europeans came they saw them use these stones but was unknown in very remote times. It was a spherical boulder, 9 to 14 cm. in diameter. Smaller sized stones have been found occasionally in former Bushman abodes.

In consideration of (1) large size and weight, (2) small size and weight, (3) different type of perforation, (4) poor workmanship in some, and the statements of these various observers quoted, substantiate the conclusion based on the analysis of the illustrated specimens, that they are not all true Bushman stones or t''koes.

Passarge[5] found no stones in the central Kalahari, although there was plenty of material suitable for the purpose of making them. He thinks they may have come from the Hottentots in the south. The sand in the Kalahari is soft and they need no stone to weight the stick, while in the southern part the soil is hard where the stone is an advantage.

[1] Barber, p. 302. This quotation and several following ones are given freely, not *verbatim*.—Ed.

[2] Passarge, p. 33.

[3] Staudinger, p. 175.

[4] Theal, p. 39.

[5] Passarge, p. 4.

The stone, according to Stow,[1] was made by

chipping a selected boulder of proper dimensions to a round shape. The perforation was made by chipping with a piece of Lydite. At first, a slight indentation was made at each end of the stone, in which a few drops of water was alternately placed and allowed to stand all night. The next morning a little more was chipped out. This was repeated and thus by slow degrees a large hole was at last worked through, which was smoothed and fitted for use.

Dornan,[2] who studied the Masarwas, says:

The hole was made by working from both sides and the drill had been of wood, with water and sand to form the cutting material. As the stick would wear away, the hole would get narrower.

The writer is also of the latter opinion based upon examination of stone F, which clearly proves that in this case a rotary movement was used as circular lines may be seen in the smooth surface, dismissing the chipping method without a question. It is possible, if not probable, that the start was made by chipping.

Quiver

The quivers are of different lengths and widths, the two here illustrated, B and C, plate VII, are 64 and 78 centimeters respectively; their diameters are five centimeters. The three remaining specimens in the collection vary from 57 to 70 cm. in length and their diameters from 5 to 7½.

The Bushman quiver is made from the "kokerboom" or quiver tree, named so by the early Boers on account of its being used for this purpose. The Bushman would remove the fibrous wood from a section of a bough and utilize the cylinder of tough bark as a receptacle for his poisoned arrows.

The botanical name of this tree is

Aloe dichotoma[3] which are believed to be of an immense age; the oldest Boer Voortrekkers will point to small trees growing close to their watering places, telling one that they have not sensibly increased in size in half a century.

Some of the quivers are very well finished while other specimens are of a very hasty and rough construction and poor workmanship.

[1] Stow, p. 67.

[2] Dornan, p. 49.

[3] Scully, quoted by Sim, Thomas R., p. 343.

The bottom of the quiver is made by stretching thin antelope hide (springbok preferred) over one end fastened with sinew or some sort of dry grass. Both the bottom and top of the quiver are reinforced with sinew, and so are the center and mid-centers, making it a very strong and rigid quiver.

The strap is fastened at the ends by the reinforcement sinew. The perforations in the quiver, seen in the illustration, are natural ones in the bark. When on a long march, the Bushman carries his quiver over the shoulder, but when hunting, it is carried in the right hand.

Bows

The Bushman bow is a very simple specimen of its kind. It shows no carvings or decorations of any description. The wood selected is very tough and usage has given it a chocolate brown color. The bow is rounded and roughly polished. It is thickest in the center and gradually tapers down at the ends almost to a point. This pointing is a very characteristic mark which one finds on almost all bows made and used by Bushmen. Passarge[1] speaks of this and attaches great value to it in recognizing the bow as being genuine. The approximate ends are reinforced with sinew, as may be seen in the illustrated specimen on plate VII.

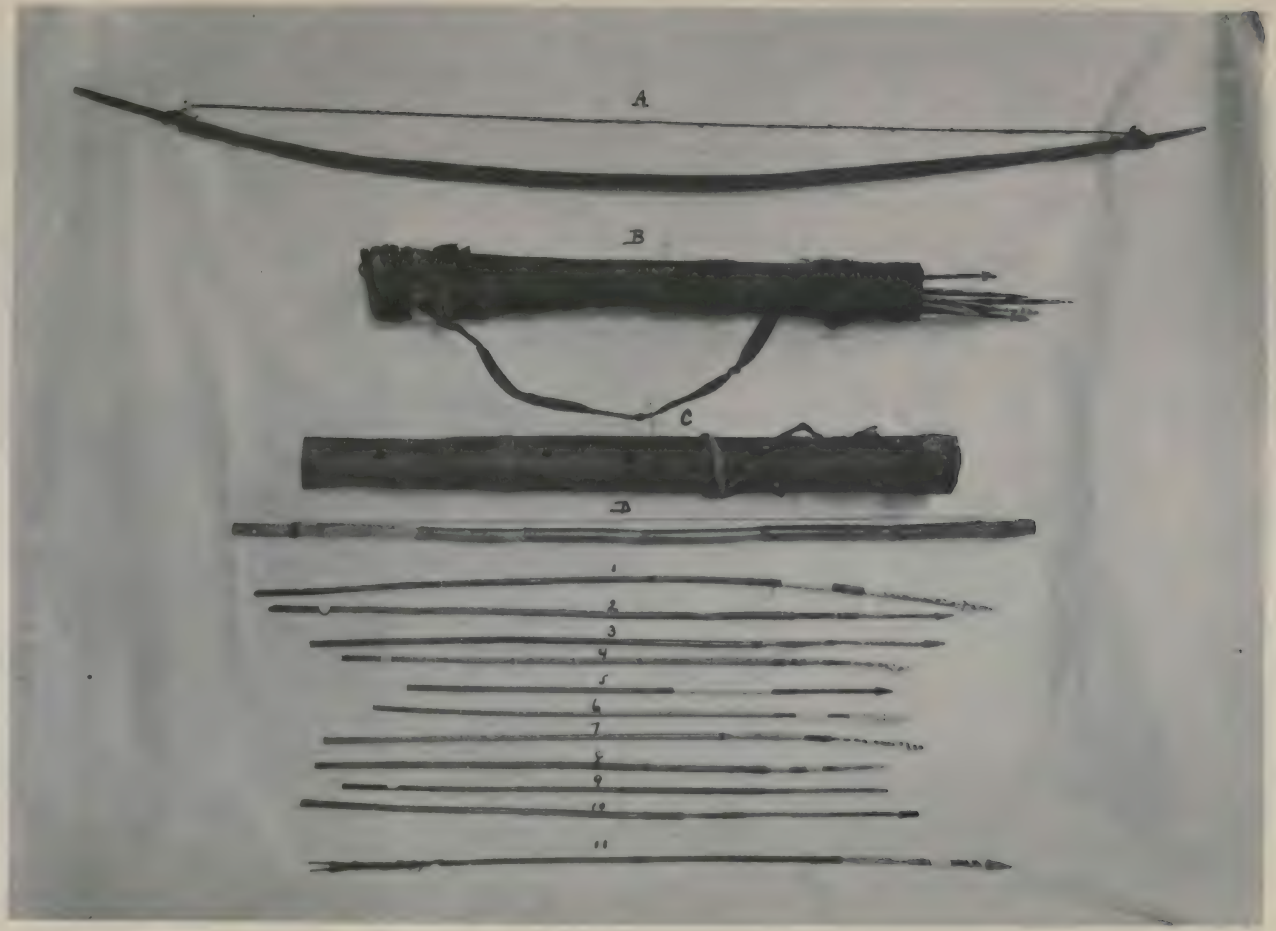
The bowstring is made from thin sinews twisted together to form a strong cord tied loosely to the ends of the bow. A lack of reinforcement sinew at this point would suggest a free sliding up and down and an easy release and setting of the bowstring. This statement, however, does not coincide with Dornan, who says:

> the bows are permanently strung, and consequently lose much of their elasticity.

The latter seems incredible when we know the Bushmen to be expert hunters, yet, on the other hand, we may add to this that the bow as a whole is an unworthy product of a true hunting race.

Dr. Peringue, director of the South African Museum, in Cape Town, during a conversation with the writer in June, 1917, said that the Bushman would seldom discharge an arrow at a long distance object. He would instead approach the game very closely,

[1] Passarge, p. 59. [2] Dornan, p. 37.



MUSICAL INSTRUMENT AND WEAPONS: A. BUSHMAN BOW; B AND C. "KOKERBOON QUIVERS"; D. T'"GOERA; 1–11. POISONED ARROWS

and being an expert stalker, and knowing the different animals in all their moods and movements, succeed in doing this without being detected. He would discharge his first arrow and the animal, not knowing whence the missile came, would often run towards the Bushman, allowing him to discharge a few more. From this we may see that such a mode of hunting does not require a very strong bow, which may explain the comparative insufficient development of this implement.

Bleek[1] mentions that there are Bushman tribes in some parts who make no bows, in which he is supported by Owen, neither do they carry them. Rickard[2] suggested that the bow was a recent acquisition by the Bushmen, but Fielden,[3] after a comparison between prehistoric arrowheads with those of later times and types, showed to him a close relationship between them and could not entertain the correctness of Rickard's suggestion.

Arrows

The Bushman arrow is uniquely constructed and is a very ingenious hunting device. No other savage tribe seems to have arrows of a similar construction. This winged messenger of death was poinsoned and was feared by all those who had come in contact with these people, or had heard from others about the dangers

Fig. 19.—Arrow: *A*, arrowpoint with poison; *B*, connecting reed or "release"; *C*, foreshaft; and *D*, shaft.

of these poisoned reeds. The writer once called a few blacks to examine one of these arrows, and informing them as what it was they made frantic faces and moved away, leaving him standing alone with the arrow in his hand. These natives had never seen a Bushman, but they said later that they had heard about them from their old people.

An attempt to illustrate the arrow may be seen in the drawing (fig. 19) showing the four parts of which these arrows consist. B

[1] Bleek, (*a*). [2] Rickard. [3] Fielden, p. 163.

was called "release" for want of a better name. It was here where the arrow in active hunting divides into two parts.

The arrowpoints are made from (1) stone, (2) bone, (3) wood, (4) porcupine quill, (5) iron, (6) glass.

The stone arrowpoints are the oldest specimens, while iron and glass are products taken from the Bantus and Colonists respectively.

The majority of the arrowpoints in this collection are made of bone; one is of iron, two of wood, and two of quill.

Passarge[1] tells us that the bone arrowpoints are made by splitting the bones of the giraffe and ostrich with an axe and are finished with sharp stones. Stow[2] mentions the use of the long bones of the ostrich.

The different shapes are shown from the drawing (fig. 20) and also the method of affixing the poison either in small areas dipped on the point or smeared in a rough fashion all over the surface.

The iron arrowpoint illustrated in A is wound about with sinew. This was done apparently to insure a more stable adhesion for the poison which would not be very strong if it was applied to the metal directly, in which case it would scale off with the formation of rust. This particular arrowhead is a very long and heavy one, and would seem a very impractical hunting implement, weighting the forward end too much.

The "release" and the upper and lower ends of the shaft are lashed with sinew to prevent splitting of the reed of which they are made.

The foreshaft is made from bone, wood or quill. When using the quill, its natural shape and appearance is not altered, and in case bone is used, it is straight with very little narrowing at either end. This changes, however, when wood is selected, in which case the center is sometimes twice the diameter of that of the ends. This may be verfied by comparing arrows 3, 4, 7, 9, and 11 (pl. VII), of which the foreshafts are made from wood, the others being from bone or quill.

It will be noticed that when quill is used for the arrowpoint the foreshaft is found to be absent. Almost all the foreshafts are

[1] Passarge, p. 59 and 86. [2] Stow, p. 68.

fastened with some sort of adhesive substance in the shaft, but some are simply inserted as tight as safety permits without splitting the shaft.

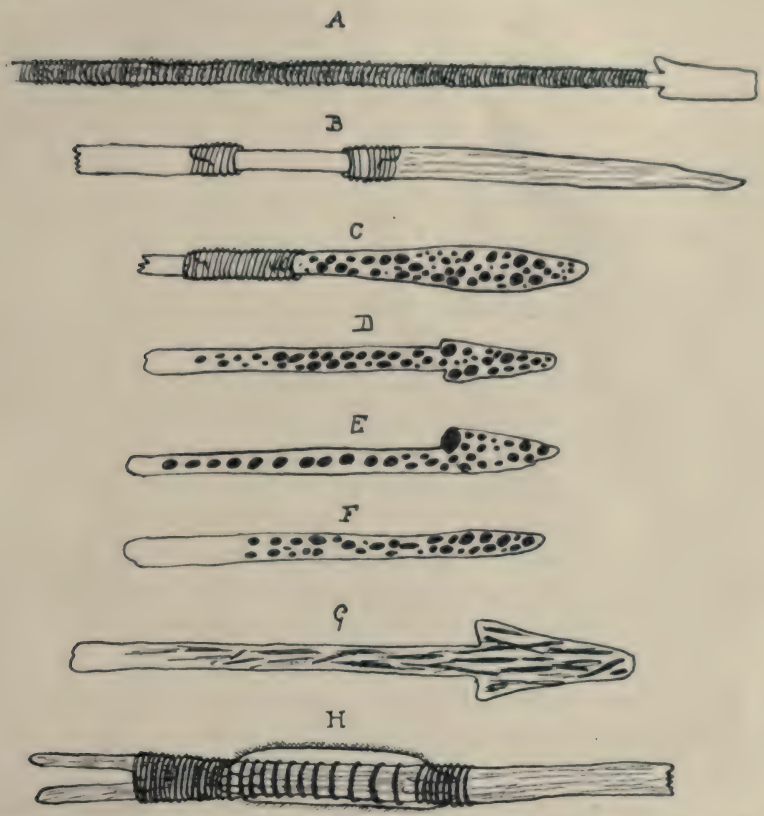


FIG. 20.—Arrows: *A*, iron arrowpoint surrounded with sinew; *B*, porcupine quill, arrowpoint; *C*, *D*, *E*, *F*, and *G*, bone.

Theal mentions a cement used for this purpose, saying

> The adhesive substance used to fasten the different parts more strongly together, was made from the juice of some round fruit, the juice of which was white and looked like water. It was a poison. This juice was warmed and stirred. After cooling, it was gathered on a stick ready for use. The Boers called this "harpis." This is probably derived from the Dutch "harpuis"—rosin.

The purpose of the foreshaft is a disputed question. One traveler mentions its purpose to be the weightening of the arrow to

insure a more stable course. This statement does not seem to be proven by facts when the several arrows are examined, after which the conclusion presents itself in contradiction to this.

First: The lightest arrowpoints (quill) have no foreshaft, as seen in arrow no. 8.

Second: The heaviest arrowpoint (iron) has a foreshaft, arrow no. 10.

The former should have a foreshaft if weight was its purpose, while the iron specimen should not have one, it being heavy enough by itself.

The writer has come to the conclusion that the purpose of the foreshaft was an economical and practical one, allowing the Bushmen to make and carry fewer shafts. The arrow after discharge will divide in two at the release, the poisonous point remaining with the animal, and the rest falling down; which in turn is picked up again by the Bushmen and made ready for immediate use by inserting a new arrowpoint.

This conclusion is supported by reproductions in some of their paintings, where one may see a Bushman carrying the arrows on his head stuck into his hair. These could not be complete arrows, first, because they would be too long and heavy, and would not remain in their position, and secondly, because they would easily catch in the brush during stalking. Therefore, the paintings probably represent the points only.

Theal speaks about the Bushmen carrying arrows on their heads to look more formidable at the approach of an enemy, but speaks distinctly of arrows as such and hence does not support my conclusion.

If the foreshaft is not for weighting the arrow and not a device to enable rapid adjustment of a fresh arrowpoint, what may its purpose be?

The shafts in this collection are made from a reed which possibly may be the *Phragmites communis* or an ally, which is usually many noded but the base may have long internodes. It will be seen that arrows 3, 5, 6, and 7 have no nodes, while the rest show many nodes with the exception of arrow 11 having one node.

The *Phragmites communis* grows in the Kalahari region, Natal, Basuto Land, and for that matter is almost cosmopolitan, it being also used in England and South America for the same purpose.

Arrow 11, probably not a Bushman specimen, is made from a bamboo which may be an *Arundinaria tesselata*, which grows in the Kalahari region, Natal, Table Mountain, and the South African coast region. The "Bamboesberg," one of the Drakensbergen is named after it. These canes are also used for assegais or spear-handles.

The Bushmen did not feather their arrows, as far as the writer is aware. Only one of the specimens is feathered, and is of the same general structure except for this and for the different style of notching. Passarge[1] could never find any feathering in Bushman arrows, but Fritsch[2] maintains that Peter Kolbe relates that the Hottentots carried them. Professor Weule quoted by Passarge,[3] maintains as a result of his studies, that the feathering preceded the leaf-tree used by the Pygmies, and hence is a close ethnic relationship.

That the feathering was present in but a few arrows and then in those which had iron arrowheads made him conclude that they were found only as war arrows and that the custom was lost when arrows were used for hunting. He maintains that this is one of the links connecting the Bushmen and Pygmies. Passarge himself also maintains that arrows with one feather were in use once in Southern Africa. Lichtenstein collected them and Hahn makes mention of them also. According to Weiner, the feathered wooden arrows are used for bird hunting. In the central Kalahari feathering is unknown.

That the Bushmen feathered their arrows is unknown to the writer, and more competent observers claim they did not. The Bantus generally do it, and apparently the Hottentots also. The conclusion that the Bushmen used iron for arrowpoints and lost the use of it is in contradiction with that which is known about them in South Africa where stone and bone preceded the iron, and is speculative to say the least.

[1] Passarge, p. 59. [2] Fritsch, p. 73. [3] Passarge, p. 87.

Arrow Poison

It was the art and secret of making the poison which made the Bushman a successful hunter and a dangerous enemy. The different sources at our disposal mention many ingredients from both the vegetable and animal kingdoms. They are: juice of the *Euphorbia striata*, poisonous spiders, caterpillars, juice of the *Ococanthera venetata*, *Amyrillis distichia*, crushed insect of the genus *Diamphidia*, pulp of venemous worm, a species of bulb containing *Haemanthos toxicara*, snake venom, poisonous ticks, plants, leaves and berries.

Stow[1] informs us that

> The Bushmen of the West use the trapdoor spider for one of their most virulent preparations. Two bites of this spider kill a tree frog in a few seconds, the death preceded by trembling and convulsions.

He also says that they have "poisons of different strengths for the different animals."

Those of the east use principally the venom of snakes, the milk of the *Euphorbia*, and the extract from the poison amaryllis.

Those of the north, according to Livingston, use the "Entrails of the N'gwa caterpillar, for their strongest poison."

Galton[2] describes the poison to be of "many ingredients and of a secret manufacture. Besides vegetable poisons" a Bushman informed him that, "the poisonous black spider (a kind of tarantula) was an important ingredient." Bryden[3] says that the

> Masarwas of the Kalahari use the N'gwa caterpillars, snake poisons, and the milk of an *Euphorbia*, but the actions of these poisons were very slow.

Passarge[4] describes

> a scrub with three pointed leaves on which larvae are found 1 to 1½cm. long, thick, flesh colored, having a grey and a dark brown stripe on their backs, and a hard body covering.

These larvæ are collected by the Bushmen and placed in grass, and left to become cocoons, which are very poisonous, ready for immediate use.

But Dornan[5] describes the making of the poison among the Masarwas and says:

[1] Stow, p. 78. [2] Galton, p. 287. [3] Bryden.
[4] Passarge, p. 52. [5] Dornan, p. 47.

The poison bags are extracted from the snakes, dried and pounded into dust, mixed with the juice of the *Euphorbia*, or *Ococanthera*. This is repeatedly boiled until it acquires the requisite degree of consistency, usually that of a thick jelly. There are other ingredients used, but for these I cannot vouch.

It seems, according to the different observers, that no one particular poison was used among the Bushmen as a whole, but that each of the scattered clans had its own formula.

The finished product was applied to the arrowpoints in two ways, first, by small areas separted from one another, and scattered over the entire surface on one or both sides; second, by smearing it unevenly over the arrowpoints. The colors of the various poisons differ, running from a dark brown to a light red and to a dirty gray. The dark red suggested the presence of blood which prompted a chemical and microscopic analysis, not only to ascertain whether blood was present, but also to learn the poisonous qualities of the compound.

Five arrows were selected, each having a poison of a different color. These were scraped off and the poison ground fine, and to it was added physiological salt solution. The guaiac test for blood proved to be negative. The iodine test for starch was applied and characteristic black cells were easily demonstrated. The methylene blue stain was taken very poorly, this added to the two former tests may be additional evidence that at least these poisons are of a vegetable nature. The microscopic examination showed (1) no blood corpuscles; (2) a large amount of vegetable matter; (3) some starch cells; (4) a few vegetable fibre cells. This substantiates the chemical tests.

It was interesting to note that on one arrow two different poisons were found to be present, each one giving a different color reaction with the guaiac test. One poison was applied to the tip of the arrowpoint, the other to the base.

The five different solutions were injected subcutaneously into guinea pigs and white rats, producing at first a slight nodding of the head, which symptom disappeared in about one hour. No after effects were noticed. Four days after the injection, the animals were apparently normal. This result cannot be considered

conclusive on account of the poison being but partially soluble, and it is possible that the insoluble part may contain the active principle. To this we may add that the age of the substance may have affected the loss of the poisonous qualities.

An English Journal of Pharmacology published a chemical analysis of poisons from arrows from the Kalahari regions obtaining the following result:

The product was obtained by crushing the insect of the genus *Diamphedia*. The active principle was found to be a toxalbumin, which acts on the red corpuscles producing hematolytic changes involving the dissolution of the hemaglobin. The symptoms of the poisons were paralysis, followed by death. Boiling destroys the effect of the poisons.

This was probably a freshly prepared specimen, although nothing definitely is said about the age of the substance.

Lewin[1] examined the poisons of the arrows collected by Lichtenstein in 1806, which investigation proved an

alkoloid to be present resembling in action and characteristics, *Haemanthus toxicaris*. The latter may be extracted from the "giftbol," so called by the early Boer colonists, which may have been a source of the Bushmen poison.

The alkaloid found in these arrow poisons, he called Haemanthin, saying that this alkaloid proved to be a very stable product, the poison being one hundred years old at the time of its analization.

The Kung of the northern Kalahari used the larvae of the Diamphidia simplex, the juice of which is obtained by squeezing them, and dried in the sun ready to be applied to the arrows.
This substance contains a toxalbumin.

J. Weise, who studied these larvae in detail, said them to be of the *Blepharida evanida*, which proved to be correct. The poison seems to contain several components. The action of these resulted in disturbances of the central nervous system, respiration and muscular movements. These symptoms were very soon obtained after injecting subcutaneously this juice. The animal becomes quiet, the eyes are closed, the animal assuming an inanimate attitude, finally falling into a deep sleep and dying from respiratory disturbances. Examination proved that the kidneys were involved

The action of this poison is much slower than other vegetable specimens and snake venoms, which compels the hunter to follow his victim for many hours and days before the animal can be captured.

So far as is known, the Bushmen never poisoned water to stupefy the fish before spearing or catching them.

[1] Lewin, p. 834.

Passarge[1] informs us that

the Bushmen had two kinds of poison easily differentiated, one of a dark brown, and the other of a very light brown color, the latter being the larvae poison.

This may be correct as far as his observations are concerned, but the collection here described shows dark red and brilliant colored substances as well.

Thompson[2] traveling through South Africa in 1826, was informed by Veldkornet Nel that the

Bushmen had advanced very much in the last forty years in the manufacture of their poisons. Nel told him that there were, among the Bushmen, snake masters or charmers who could resist their bites. This resistance they could transfer to others by subjecting them to a regular diet containing these poisons.

Apparently reference is made here to the application of the poison, to the scarifications in the skin, a practice known to have existed among them.

The Bushman had his poisons but also his antidotes and for each particular poison his particular antidote. If one were wounded by a cobra or by a "pofadder," one would make an incision near the wound and rub some of the dried poison of the same kind of snake into the cuts. Here we have an example of our modern inoculation, and an effort to obtain an acquired immunity. Some of the Bushmen rubbed the poison into small cuts in order to resist more easily the poisonous effects. So we find here in the former method one aiming at a cure, while the latter is a preventive measure, both interesting as found among a primitive race.

They had also vegetable antidotes for snake bites as discovered by Chapman,[3] quoted by Stow.

The mode of applying this, however, remained a secret. The antidote for the N'gwa caterpillar poison was a tuber called "Kalahetlue." For snake bites they use the root of a plant called "oekam," which they considered a specific antidote for this, curing them of the most venemous bites. They would either eat eight or ten grains or take it as a decoction, it acting as an emetic. They also scarified making an incision near the wound which they sucked with some of the root chewed in their mouths. This is evidently to prevent the poison from acting upon the gums. The sucking out of the poison is not necessary, but is done by way of precaution.

[1] Passarge, p. 59. [2] Thompson, p. 391. [3] Stow, p. 77.

This statement is not a very reliable one; one can easily conceive that as soon as one is bitten by a snake, much of the poison can be prevented from reaching the blood stream if immediately sucked out, a measure recommended when the poison enters the system through an external wound.

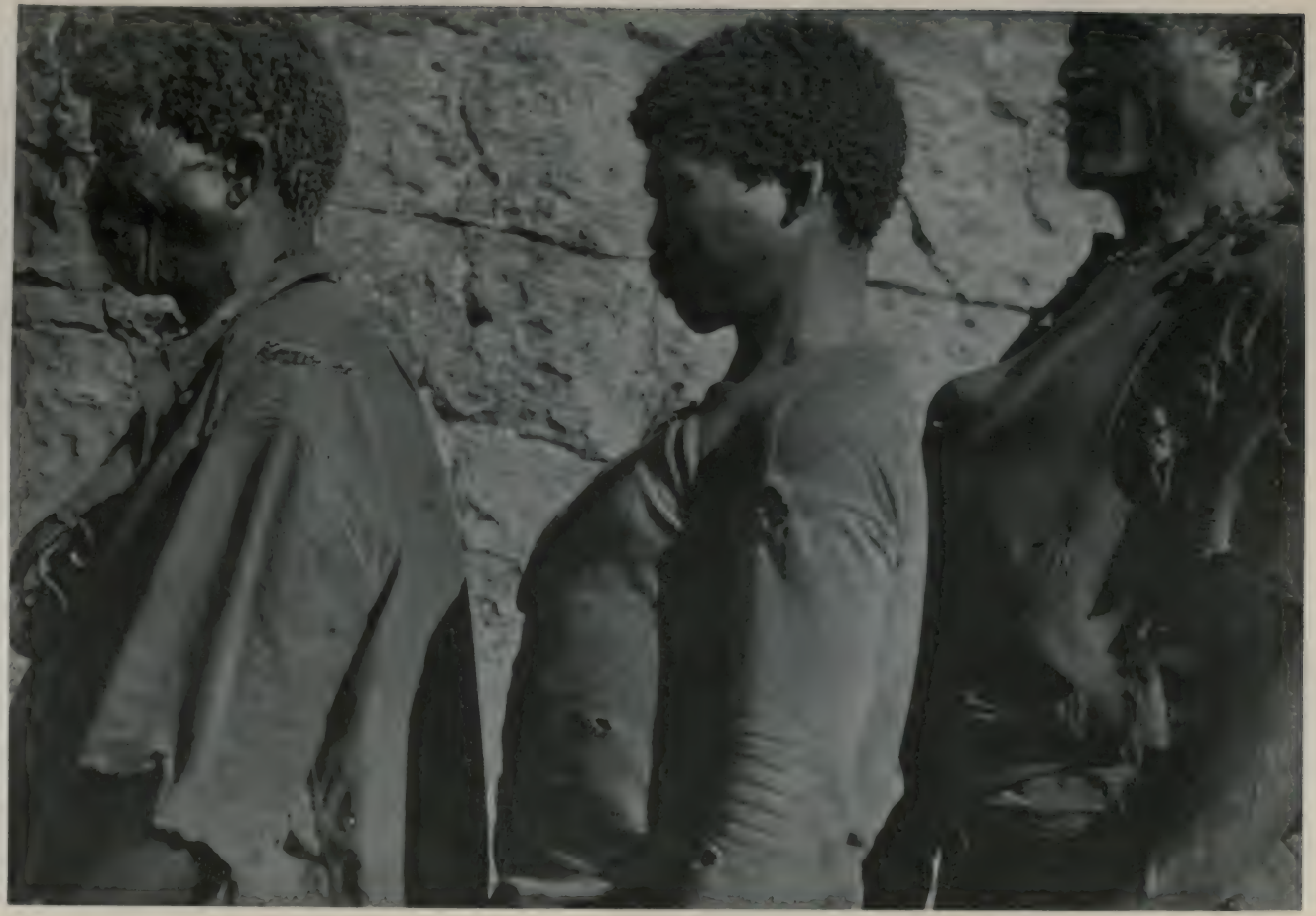
UINTJES BAG

This bag (fig. 21), made by the old Bushman's wife, was constructed from one continuous cord. Its width is 17 cm. and its length 22 cm. The material used is a small "biesje" or small reed

FIG. 21.—Uintjes bag.

grass, cut and rolled with a stone to a flat band after removal of the outer covering. The fibres are then separated and chewed until

BUSHMAN, 42 YEARS OF AGE, HIS SON, 14 YEARS OLD, FRONT AND PROFILE; AND HIS WIFE, HIS SISTER, AND THREE CHILDREN



BUSHMEN, FATHER AND SON, 70 AND 42 YEARS OF AGE RESPECTIVELY. THEY WERE CAPTURED 40 YEARS AGO BY A BOER FOR WHOM THEY ARE STILL WORKING. THE MAN ON THE RIGHT DOES NOT HAVE THE CHARACTERISTICS OF A PURE BUSHMAN

reasonably pliable. They are then twisted into a rope ready for making the bag and are kept soft by sprinkling with water. In color this rope is similar to ordinary twine and is rather stiff to the touch. The cord by which the bag was slung over the left shoulder in this illustration is shorter than usual. The roots eaten by the Bushmen are collected in these bags. Mr. Van der Zyl, who captured these Bushmen some thirty-five years ago, informed the writer that these bags were being used at that time. These men are still working for this old Boer who claims them to be far superior to the negro as servants, and as herdsmen they are unexcelled.

FIG. 22.—Section of Uintjes bag showing "continuous coiled netting."

The style of netting used in this bag is called by Mason[1] "coiled work without foundation," which seems a lengthy and indefinite term. The writer has adopted the name "continuous coiled netting" illustrated in the diagramatical sketch (fig. 22). The name "netting" although knots are used, is not a contradiction of the definition.

BIRD SNARE

This implement (fig. 23) is made from the same material as the bag. It is very long, measuring about eleven feet, and has ten snares such as those illustrated in the diagram. On one end is a

FIG. 23.—Drawing endeavoring to illustrate how the birdsnare was used.

loop by which it is fastened to a stick or stump of a small bush. The other end is left free, but to it is attached a ball of grass. After the snare has been placed in position the Bushman goes away

[1] Mason, p. 246.

a distance and lures the birds towards the snare. This is kept open by strong twigs of grass and are very well placed to mislead the birds. After passing its head through the loop, the bird finds itself caught but in trying to escape is brought down again by the weight of the grass ball. The end fastened to the stick is merely to hold the snare above the ground, and is not for the purpose of fastening it. This is to overcome the breaking of the snare by the sudden strain when the bird tries to get away. The Bushman, seeing the bird caught, runs over quickly and kills his prey with a stick.

Stow does not mention the bird snare, and nothing could be found in their folklore regarding it, which strengthens the writer's opinion that this implement is not one of Bushman origin, but an adapted one from the Bantus.

Fish Trap

This was made for the writer by the old Bushman (pl. VIII) who informed him that this kind of trap was the one the people of his

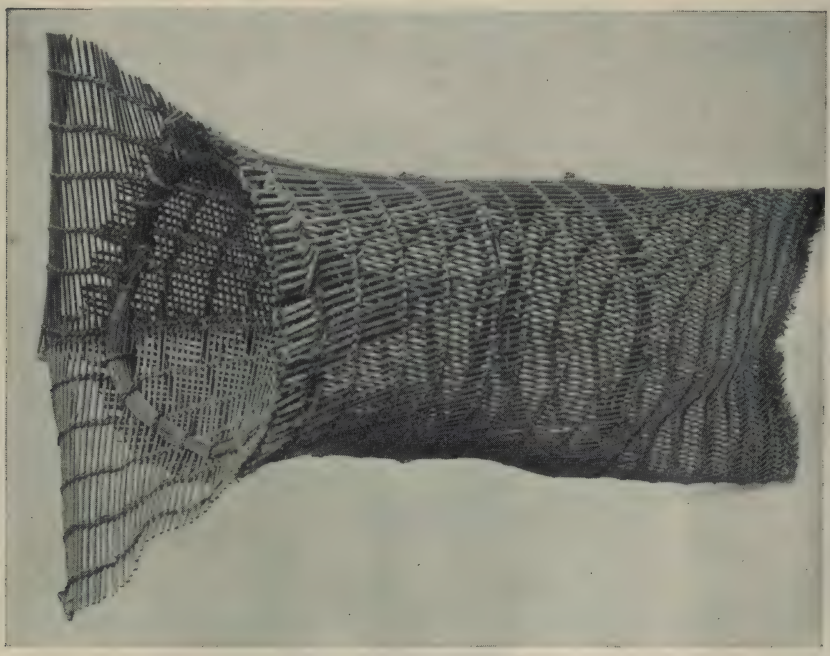


Fig. 24.—Fish trap.

"nation" always used. He made this trap (fig. 24) in one day after walking eighteen miles to obtain the required material, which the Boers call "taai boschje." It grows on the open veld in small patches. The finer specimens of this material are used for the finer work, such as the bird snare and uintjes bag.

The trap is of a very good construction and very strong. It is about three feet long and from a foot and a half to two wide. It is particularly adapted for small streams, the lateral wings serving to guide the fish towards the center. It is circular in front but flattened in the rear. The fish are removed from the flattened end by loosening the grass cords which holds this together. The front is rigid and is never tampered with. The entrance to the trap is cone-shaped, having an oval opening at the distal end of about ten centimeters diameter. The reeds extend beyond this opening, and downward, thus barring the exit, as shown in the drawing (fig. 25).

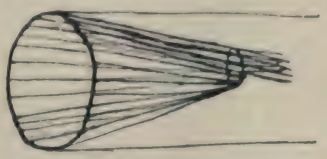


FIG. 25.—Sketch shows arrangement of the reeds which bar the exit from the trap.

It is a question whether the trap is of pure Bushman origin. Stow[1] describes them as being six feet long and two feet wide, but no reproductions can be found in paintings nor are they mentioned in their folklore. The Bantus in different sections in Africa use fish traps of a similar construction, but these are all of a larger size.

THE T'GOERA

This is the only musical instrument made and used by these people, and is also called the Bushman reed. It measures from 70 to 80 cm. in length. The bow is made from a heavy thick reed, 1½ to 2 cm. in diameter. The string, of the two specimens in this collection, is made from a grass twisted very tightly into a thin cord of great strength.

This instrument is also called "goora, gowra, gurra, t'goera, kora," etc. The essential characteristics of the instrument may be seen in the photograph (pl. VII, D) and drawing (fig. 26). The t'goera

[1] Stow, p. 93.

here illustrated was made by the old Bushman who also made the fish trap, informing the writer that this was the only instrument he had ever played upon, and had never heard of any other instrument being used by his people. It was always taken from place to place and usually played in the stillness of the evening when gathered around the fire, when the monotonous tones and the attention of the player were disturbed by no outside influences.

FIG. 26. — Drawing showing shape of quill, mode of attachment to bow and string, and its interposition between the two.

The Hottentots had an instrument similar to the t'goera, but with a difference. It had a half calabash with two holes, through which was drawn the string. This was allowed to pass the full length, thus obtaining a sliding scale.

Peter Kolbe,[1] a German traveler, in 1704 first described the Hottentot instrument and called it the Gom-Gom. Sparrman,[2] and Thunberg,[3] the Swedish botanist, both described this instrument, the former calling it Korā. Barrow mentions having heard and seen them play an instrument, the description of which corresponds to the t'goera. He says the sounds produced by applying the mouth to the quill are varied according to the vibratory motions of the quill and cord by inspiration and expiration. He calls this instrument the "Gowra.'

Lichtenstein[4] describes it also as being played upon by the Hottentots "but is seldom well played except by old herdsmen." This seems to indicate that at the time of his travels the t'goera was losing its usefulness being only well played by old men. Burchell[5] mentions its being played by the Hottentots in the Korrana region, and so does Moodie,[6] but the latter mentions no particular place where he saw this, describing it as a "stick about three feet long with catgut; at one end a piece of quill." By this he means the interposition of the quill between bow and string as shown in the drawing (fig. 26).

[1] Kolbe, p. 271.
[2] Sparrman, p. 228.
[3] Thunberg, p. 102.
[4] Lichtenstein, p. 232.
[5] Burchell, p. 458.
[6] Moodie, p. 225.

It is Moffat[1] who first describes the t'goera as being in use by the Bushmen, and his description is identical with the one made by Moodie.

The quill used is from the "knorhaan" or bustard. The feather is split and then flattened after being made wet. It is then pressed and rolled and allowed to dry, after which it is cut to the required length and shape.

Bleek[2] in one of the Bushman folktales, "The Thunderstorm," speaks of the boy playing on the "goura" and being rebuked for playing at that particular time.

The t'goera is used almost everywhere in South Africa. The writer saw a boy play on it on a Sunday morning in the streets of Lorenzo Marques Delagoa bay. Casalis saw it among the Basutoes, calling it the "lesiba," and Campbell mentions it as being used by the Kaffirs of Algoa bay, Cape Colony. Fritz tells about the Bechuanas playing on it, who called it "goorra, goorah and also lesiba," the same as the Basutoes. He mentions it being played by Hottentots and Bushmen, but particularly by the Koi-Koin Hottentots.

The t'goera is unique in that the vibrations are not caused by tapping with a stick or finger, but by the force of the breath acting upon the quill causing this to oscillate rapidly and violently, while the mouth is used as a resonator, thereby increasing the sound.

It may be called a mouth-blown stringed instrument having a flat piece of quill interposed between one end of the string and reed, which in effect widens the string at that point. When blown upon, the quill will stand first upon its edge, but will be thrown back to its former horizontal position and then further back again to a perpendicular position. Whenever the latter is reached the movement is suddenly checked by the air current and is thrown back suddenly creating a rapid oscillating movement. The result obtained is the same as the one when a blade of grass is placed between the hands and blown upon violently emitting a sound recalling our boyhood days.

[1] Moffat, p. 58.

[2] Bleek, p. 321.

The t'goera is an instrument played not for an audience, but solely for the player's own benefit and pleasure, which might be called a "private musicale."

To ascertain by whom the instrument was first introduced, is a very difficult problem and becomes more complicated while time passes on. Most of the writers describe it as a Hottentot instrument, but one must be careful in accepting this at its face value or on the absence of reliable ethnological data. The two terms, Hottentot and Bushman, were often synonymous, and although the names may have been used correctly, we have no reliable authority.

Passarge[1] did not find it used in the Central Kalahari region, but did find it south and southeast of it, and among the Hottentots of Great Nama (namaqua?) land. This evidence may prove its origin to be in the south. This considered, he says,

> in connection with the perforated stones and arrows, may prove the instrument to be of a Hottentot origin.

The writter cannot support this hypothesis, first, because the perforated stones have not been proven to originate in the south, but rather northward; second, it contradicts the migratory movements of these peoples; third, on account of the t'goera's being mentioned in the Bushman folklore; and fourth, because Peter Kolbe, the earliest traveler mentioning such an instrument, does not describe the t'goera but the "gom-gom" being played by the Hottentots, and having a sliding scale.

Upon consideration of these facts, it rather may lead us to conclude that the Hottentots were not the originators of the t'goera.

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THE LITTLE-KNOWN SMALL HOUSE RUINS IN THE COCONINO FOREST

BY

M. R. F. AND H. S. COLTON

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Introduction

THE present paper is the result of a survey of the "small house" ruins in a limited area east of Flagstaff, Arizona. Its aim is not only to call attention to the existence of such antiquities in this region but also to show some of the relations that exist between them and the physical characteristics of the neighborhood such as topography, water supply, and arable land.

Over a wide area of the high plateau of New Mexico and Arizona is found this type of ruin which has been described by various authors as the small house. In contrast to the extensive pueblo and the well-preserved cliff ruins these small houses are either inconspicuous heaps of stone or are indicated by faint traces of room outlines. So faint are the traces of the ruin and so little reward has come from the few that have been excavated that archaeologists as well as curio-hunters have largely passed them by. To be sure some mention of them has been made by Bandelier (1892), Cushing (1886), Hewett (1904), Hough (1901), Kidder (1915), Nelson (1916), Prudden (1903) and Shimer (1910) but these are usually but brief references made in passing to a more interesting subject. The small house has been neglected as a basis of serious study.[1]

Method

The region explored extends from the Dry Lake hills and Elden mountain, outlying masses of the San Francisco peaks, south to Walnut canyon and east from Flagstaff to Turkey tank and Winona. (See figs. 27 and 28.) This includes an area of some hundred

[1] This was written in 1916. Since then several papers have appeared on the Small House Ruins.

square miles. On a whole this was explored in a most superficial way. Yet about eight square miles were explored with care. In these eight square miles nearly all the antiquities have been recorded. In the rest of the region many more may be found.

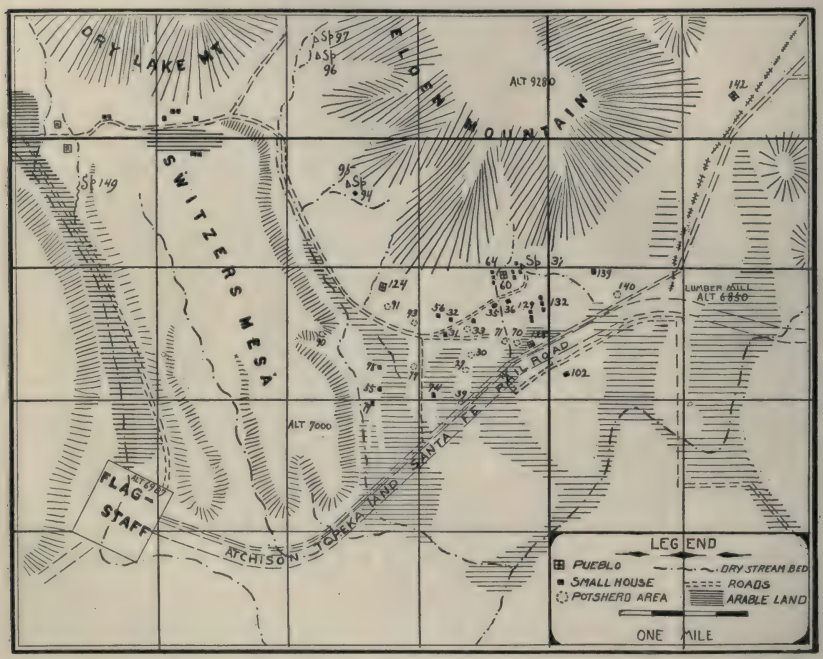


FIG. 27.—Map of region south of Elden mountain.

In searching for the faint traces of former habitations the following method was used. It was our custom to walk or ride across the country, our eyes more or less glued to the ground. When potsherds were discovered the region was carefully searched. With very few exceptions a ruin was found near by. The dimensions were then paced, a method of measurement within the limit of error for an unexcavated ruin. All the decorated surface potsherds were collected as well as a few of the undecorated ones which were always in much greater abundance. A sketch was made on which the dimensions as well as the points of the compass were indicated and information as to the location was recorded. In some cases photographs were made, yet these were unsatisfactory as they

FIG. 28.—Map of region east of Elden mountain.

showed little more than the surrounding scenery. On discovery each house was given a serial number which was marked on all artifacts collected on the site. Where there are a number of one-roomed houses clustering about a many-roomed house as is often the case, it is convenient to refer to the cluster under the number and that the number be given the principal house. This method of notation is convenient as it allows one to give the ruin a designation in the field.

SITES

The sites may be classified as follows: (*a*) Hunter sites; (*b*) shelters of wood, adobe, or cornstalks; (*c*) small stone houses of one to ten rooms; (*d*) pueblos or clusters of many-roomed houses; (*e*) forts. In one of these classes all sites in this region may be placed, not excepting the well-known cliff houses and cavite rooms. Like any other biological classification the divisions between these groups are not always clear, we have intergradations, but for practical purposes the classification is convenient.

HUNTER SITES

While the lower end of Walnut canyon has held at one time or another a large population of people of pueblo culture, the evidences of whose occupation is everywhere exhibited by cliff ruins, house ruins, and the accompanying potsherds, the upper end of the canyon exhibits none of these features. The same rock ledges exist in the limestone which have been taken advantage of to the east to such an extent at the well-known cliff dwellings. Not only are the ledges present in the limestone but also there are caves in the Coconino sandstone at the bottom of the canyon, large dry caves that would give good shelter. Excavating the floor of such a cave, about three-fourths of a mile east of Fishers tank, brought to light under ten inches of sticks and faeces of small rodents and under four inches of fine brown soil a layer of charcoal one inch thick under which was yellow sand. From this charcoal layer was recovered the lower jaw bones of an adult as well as a young Virginia deer together with the end of a humerus from the same species. Also there was found the tibio-tarsus of a large bird and one obsidian

chip. This last was the only artifact found. As no potsherds are found in this part of the canyon it is probable this cave was the refuge of some wandering hunter.

Another hunter site (90) was discovered among the boulders on the talus on the east side of Switzer's mesa. These are here natural shelters which have a commanding position overlooking a little valley. About are an abundance of obsidian chips as well as a few potsherds showing that not only hunters had occupied this shelter but also people of pueblo culture.

SITES WITH PUEBLO CULTURE

As this is a survey the other sites can more conveniently be considered with respect to locality and from this point of view the region naturally divides itself into districts depending on water supply, arable land, and the possibility of defense. These are as follows:

(1) A little park between Switzers mesa and Dry Lake mountain.
(2) About Elden spring.
(3) About Doney Park.
(4) Winslow Road between Doney Park and Gourd Flat.
(5) Gourd Flat.
(6) Fortress Hills.
(7) Turkey Tank.
(8) Walnut Canyon.

Switzer's Mesa Group

Between the north end of Switzer's mesa and Dry Lake mountain is a small park of twenty or thrity acres. At present this park contains two fallow fields full of weeds. Two tumble-down cabins lie to the north on the edge of the forest overlooking the fields. Around this park are ten small house ruins. These are all shown on figure 29.

Casa 21 A. Township 22N–R7E Sec. 34. This is a three-roomed house composed of two large rooms 15 × 18 and 15 × 15, with a small one 6 × 6. Here was found one half a basalt metate stone. Black and white decorated potsherds collected.

Casa 21 B. Township 22N–R7E Sec. 34. A one-roomed house a few feet NE. of Casa 21 A. The traces were so faint that the room could not be measured.

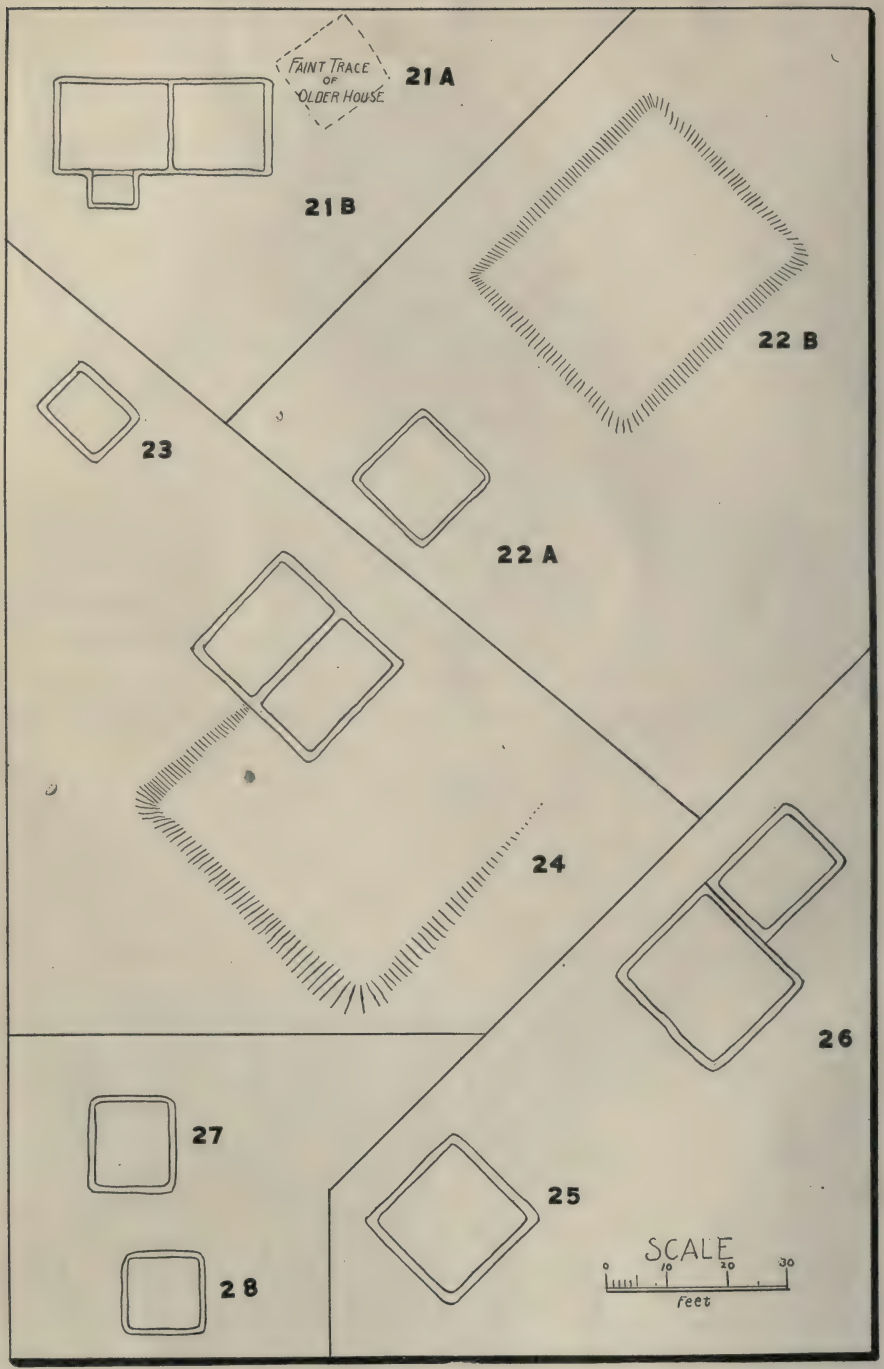


FIG. 29.—Plans of a group of small house ruins about a little park between Switzer's mesa and Dry Lake mountain.

Casa 22 A. Township 22N–R7E Sec. 34. A one-roomed house 915 × 15 feet. Pottery sherds were very scarce, only two or three black and white being found.

Casa 22 B. Township 22N–R7E Sec. 34. Northeast of Casa 22A 24 feet s a mound 42 × 36 feet.

Casa 23. Township 22N–R7E Sec. 34. A house 9 × 12. One sherd of yellow ware with brown design was found here. But three others of this type were found on this side of the Little Colorado and they were on the edge of a lava flow 50 miles NE. unassociated with other artifacts.

Casa 24. Township 22N–R7E Sec. 34. A house of two rooms 30 feet southeast of Casa 23. The rooms are both about 12 × 21. On the southern corner is a levelled terrace below which potsherds are very abundant. A two-colored red and black ware found. The ruins are better preserved than the others in this group suggesting that they were occupied at a later period than any of the others.

Casa 25. Township 22N–R7E Sec. 33. A one-roomed house 18 × 18.

Casa 26. Township 22N–R7E Sec. 33. A two-roomed house 39 feet NE. of Casa 25. The rooms are 18 × 21 and 18 × 12. No decorated ware.

Casa 27. Township 21N–R7E Sec. 4. All the houses mentioned above are north of the park, this house as well as the next following is found to the south. Casa 27 is a one-roomed house 15 × 12. Red potsherds with a black design found here.

Casa 28. Township 21N–R7E Sec. 4. This house located 12 feet south of 27 is of one room 12 × 12.

The source of water for the Switzer's mesa group seems to be from the arroya that passing the east side of the Flagstaff reservoir flows over part of the Switzer's mesa lava. Here there is running water for a short distance,—Spring 149. (T21N–R7E Sec. 5.) It is within half a mile of the nearest house Casa 25. Springs no. 96 and 97 are within a mile of the most easterly house Casa 21.

Elden Spring Group

This group of houses is found in the forest within sight in most cases of the parks that lie on the gently sloping *bajada* at the base of Elden mountain. Most of the ruins are found in T21N–R7E, Sections 11 and 12. The only other source of water is spring 95 which lies three-fourths of a mile to the north of the farthest outlyer of the group. Tank 147, an artificial tank, is close to Casas 78, 79 and 55, and may be situated on the site of an earlier one that supplied water to those houses.

Elden spring (37) is a veritable mine for potsherds. They are everywhere abundant. The ruins found about this spring can be divided into two classes: (a) small houses and (b) pueblos.

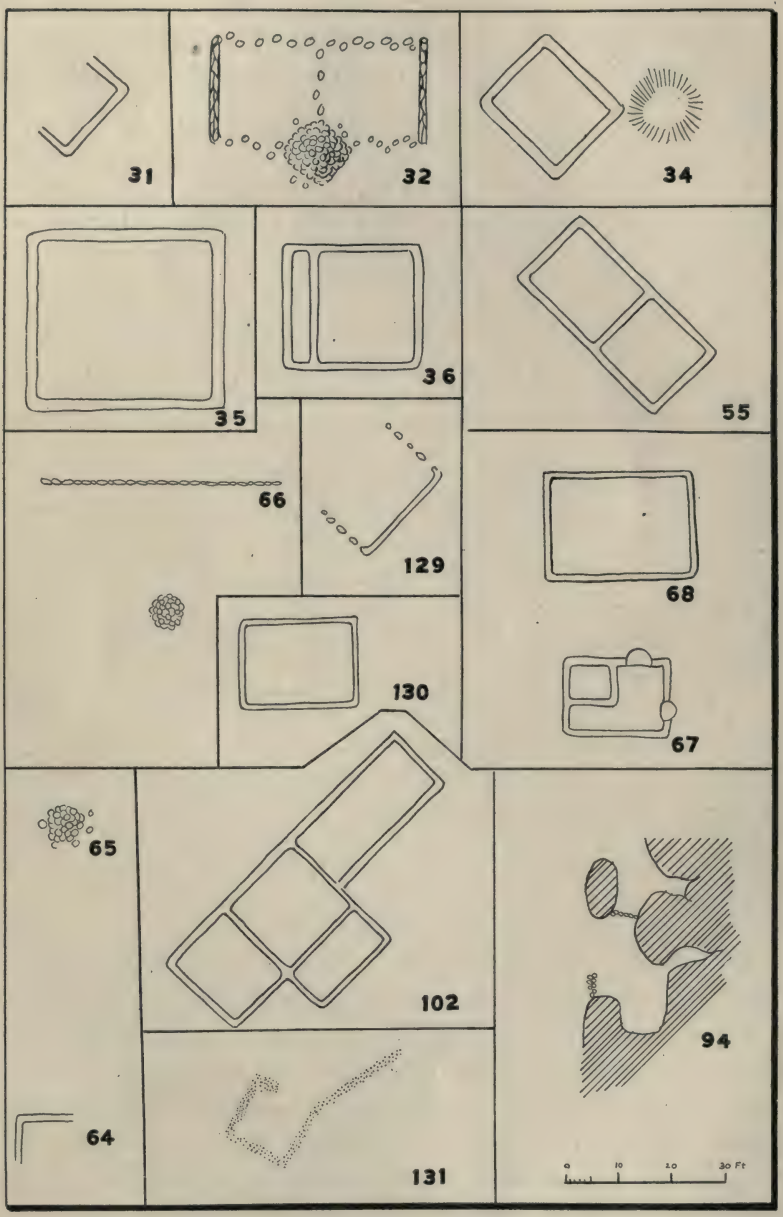


FIG. 30.—Plans of a number of small house ruins which center about Elden spring.

A. Small Houses. Township 21N–R7E. Section 12

Casa 29. In Eben Greenlaw's pasture. A sherd area that contained some black and white was found in the center of which was a mound. A ditch six feet long and three and a half feet deep was cut into the mound and the only possible artifact found was a clay nodule. The mound might have been built by prairie dogs.

Casa 30. A center of abundant sherds was found at the end of the above pasture. As it was in a cultivated field any mound or other trace of a house had been removed. No decorated pottery.

Casa 31. East of gate 200 feet in a pasture at foot of the mountain a single-roomed house was found, with a wall very well preserved. This may not have been a prehistoric dwelling, as no potsherds were found about it. On the other hand there was nothing about to indicate the site of a modern habitation. (Fig. 30, no. 31.)

Casa 32. East of 32 there is another house of two rooms not well preserved. They seemed about 18 × 18. On the south was a mound of stones. (Fig. 30, no. 32.)

Casa 33. A sherd area with some piles of stones but with no distinct traces of houses. No decorated potsherds.

Casa 34. A single-roomed house 15 × 18 to the east of which is a mound. Potsherds very abundant. (Fig. 30, no. 34.)

Casa 35. On the west side of the arroya south of Elden cabins is a very large single-roomed house 30 × 33. Black and white decorated ware. (Fig. 30, no. 35.)

Casa 36. On the east side of the above arroya is another house with one large room 18 × 21, with a narrow room but three feet wide adjoining. The stones from Casas 36 and 35 had been used in the construction of a dam by the Eldens and in the foundations of the two log cabins. Black and white decorated ware. (Fig. 30, no. 36.)

Casa 37. At Elden spring is the trace of a very small house 6 × 4.

Casa 38. In the arroya 50 to 75 feet below is the trace of a larger house 12 × 12.

Casa 39. In the cultivated field of C. A. Greenlaw near the road was a sherd area with near by a lot of stones piled against the fence. This suggests the site of another ruin.

Casa 56. The very dim outline of a house a hundred feet north of Casa 31. Sherds present.

Casas 64 and 65. Only traces of houses visible. 150 feet NW. of Casa 57 Elden pueblo. (Fig. 30, nos. 64 and 65.)

Casa 66. Traces of walls and houses in the chaparral but nothing clear. North of 64 and 65. (Fig. 30, no. 66.)

Casa 67. House west of Elden spring, 200 feet NE. of Casa 58 Elden pueblo. Two rooms—a small one cut out of the large one. (Fig. 30, no. 67.)

FIG. 31.—Photograph of casa 74 after excavation.

sherds with black design and clay nodules. The original floor was 8 inches below the present level of the pasture. Black and white decorated potsherds found scattered about the region. (Figures 31, 32.)

Casa 77. A mound 16 × 12 feet, 12 inches high. There are many sherds about. It was not proved to be a house ruin.

Casa 78. A mound 45 × 15 feet. NW.–SE. is the long axis. This is the center of a sherd area. Many scattered rocks about.

Casa 79 (Section 14). Just over the fence from section 11 is a mass of scattered dacite rocks indicating a house ruin about 42 feet by 12 feet. Here was found the fragments of a metate stone which when pieced together gave more than half of the tool.

Casa 90. Caves in the talus of Switzer's mesa. They are just under the ruin and seem to have

Casa 68. House of one room 18 × 27 feet. 15 feet north of Casa 67. (Fig. 30, no. 68.)

Casa 70. Sherd area—pile of stones removed by rancher.

Casa 71. Sherd area—slight mound —no stones for building material in the immediate neighborhood. Red and black ware.

Casa 73. This is a very doubtful ruin. There are stones about and the trace of a wall across a little arroya. Sherds were found. It may be part of an old trail indications of which were found in other places or perhaps a tank.

Casa 74. A small house 6 × 14 in C. A. Greenlaw's pature. This was excavated July 31. There was found a broken mano, some plain red sherds, red

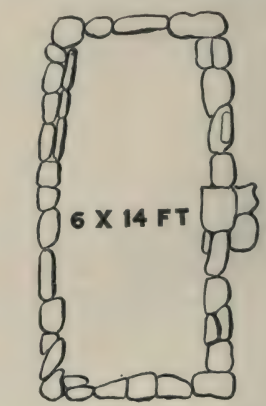


FIG. 32.—Plan of casa 74 after it was excavated. Below is a section of the same.

been more probably the temporary habitations of hunters. Obsidian chips are more abundant than pottery.

Casa 91. A sherd area just south of pueblo 124. May be nothing more than part of the trail to Elden spring.

Casa 94. A cave on west side of Elden mountain. A sandstone mano and parts of a metate stone found—remains of walls. (Fig 30, no. 94.)

Casa 102. A four-roomed house, south of Walnut canyon road on limestone, one half mile from railroad crossing. Sherds very abundant both black and white being found. (Fig. 30, no. 102.)

Casa 128. Large mound facing the main road. Many sherds, some red and black. Many of the loose stones had been removed to fence line. 72 feet across. Several rooms may be traced. To the east are other smaller mounds. (Fig. 33, no. 128.)

Casa 129. House, one wall distinct, 21 feet long. Old worn sherds. South of chimney of old cabin. Black and white, red and black. (Fig. 30, no. 129.)

Casa 130. North of old chimney is a single-roomed house, 21 × 15 feet. (Fig. 30, no. 130.)

Casa 131. NNE. of Casa 130 are two parallel rows of boulders. These seem to mark an old road to Elden spring and are of recent date. One of these "fences" cuts the ruin of a single-roomed house 12 × 12. A broken metate stone was found near by. (Fig. 30, no. 131.)

Casas 132–138. Are a group of houses buried in the chaparral, the ruins of which are all indistinct. The houses are located on little ridges between arroyas. (Fig. 33, no. 132–138.)

132 Is a depression 30 feet across.

133 Two such depressions with a wall to the north.

134 Faint trace of a single-roomed house.

135 A depression with walls recognized on the south side—also traces of rooms.

136 Faint trace of a house 10 × 12 feet.

137 Faint traces of another house.

138 Faint traces of a house 12 × 15 feet east across an arroya. There is a mound just south of this house.

Township 21N–R8E. Section 6

Casa 139. Back of the Greenlaw lumber mill is a small house 18 × 20. Red and black sherds abundant. This is on the old trail from pueblo 142 to Elden spring.

Township 21N–R8E. Section 7

Casa 140. A potsherd area. This may be part of an old Indian trail or it may be the site of a house. Red and black as well as black and white decorated potsherds.

B. Pueblos

(1) Elden Spring Pueblo

The Elden Spring Pueblo is in Township 21N–R7E, Section 12. This covers an area about 370 × 95 feet and is situated on a ridge between two shallow arroyas, about 100 yards west of Elden spring. Red and black as well as black and white sherds found. (Fig. 33, nos. 57–69.)

Casa 57. A depression 18 inches deep and 18 feet in diameter.

Casa 58. A depression bounded by rectangular walls 30 feet across.

Casa 59. This is a large house showing traces of many rooms.

Casa 60. This is another large house 36 × 60 but on the surface of the ground shows no trace of rooms.

Casa 61. A small house.

Casa 62. A complex of rooms the relations of which are not clear. Black and white decorated potsherds.

Casa 63. A wall 42 feet long alone visible.

Casa 69. Another depression, 18 inches deep, 60 feet south of 63.

(2) Pueblo 124 (Pl. x, fig. 2)

This Pueblo is located in Township 21N–R7E, Section 11. It lies about a mile west of the Elden Spring Pueblo. It differs from the latter in that much stone was used in its construction so that the ruin is now composed of heaps of dacite boulders some three or four feet high. (Fig. 33, nos. 92, 107, 120–127.)

Casa 92. Is a single-roomed house, 15 × 18 feet. It differs from the other parts of this ruin in that the outline of the room is distinct there being no pile of stones on the site.

Casa 120. 12 × 30 mound 2 feet high. Red and black, black and white decorated potsherds collected.

Casa 121. 12 × 54.

Casa 122. 12 × 50. Rooms visible. Black and white potsherds collected.

Casa 123. Pile of stones.

Casa 124. 30 × 30. Mound of stones four feet high.

Casa 125. 12 × 12. Mound of stones.

Casa 126. 15 × 15. Mound of stones.

Casa 127. 15 × 15. Mound of stones.

Casa 107. 15 × 15. Mound of stones.

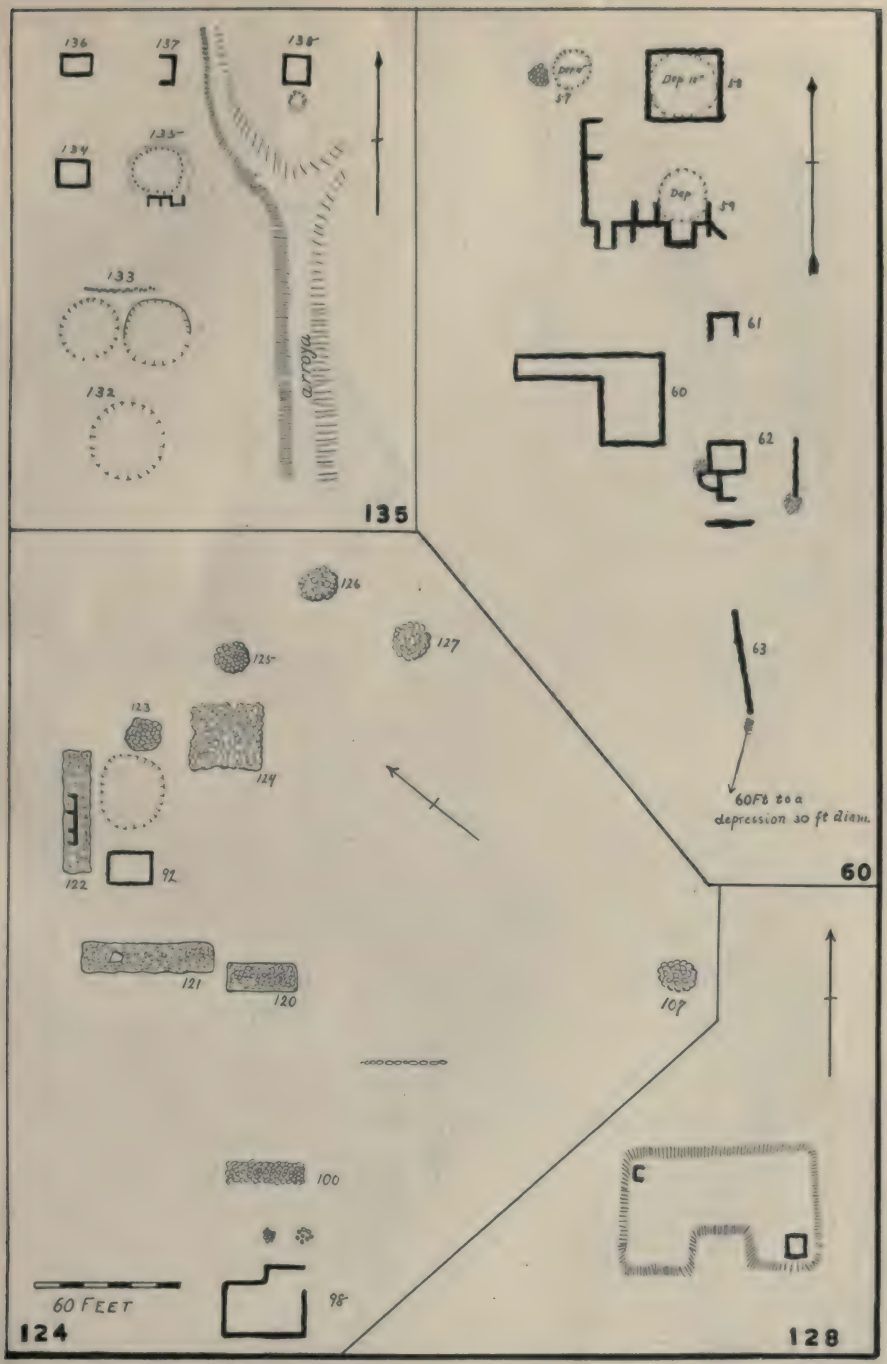


FIG. 33.—No. 60 is map of the Elden Spring pueblo, No. 124 is map of a pueblo one mile west of Elden spring, No. 128 is a small pueblo a mile east of Cliff station, and No. 135 is a group of small houses south of Elden spring.

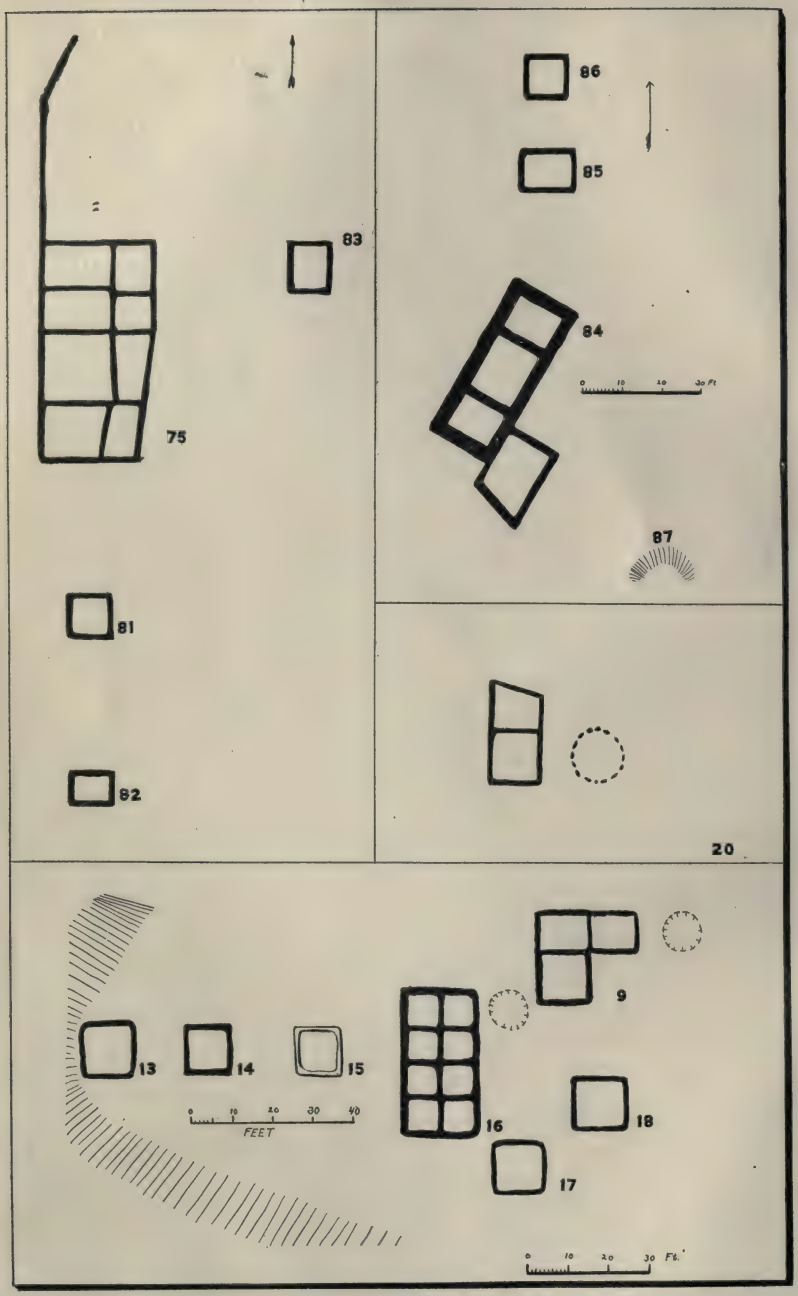


FIG. 34.—Small house ruins near Gourd flat.

(3) Pueblo 142 (Pl. x, fig. 1)

This Pueblo lies on a ridge between two little arroyas on the east side of Elden mountain, northwest of Sheep hill and 200 feet northwest of the logging railroad in Township 22N–R8E Section 31. It was discovered just before our return to the east so it was not completely surveyed. The main building proved to be much larger than any other in this district and in a better state of preservation partly due to rectangular blocks of limestone entering into its construction. That it had been of two or three stories was evident. Around the main building were indications of other one-storied structures of but a few rooms each. It is the largest and best preserved pueblo in the district which is not located on a hill-top. It would be well worth a systematic study. Decorated pottery of both the red and black and black and white occurs in great abundance. It is located about halfway between Springs 37 and Spring 141.

(4) The Winslow Road Group

(Township 22N–R8E Section 36)

These houses are on lava terraces overlooking the valley of the Rio de Flag between Gourd flat and Doney park. The probable source of water supply was in tanks in the Rio de Flag which passes through a box canyon at this point. (Fig. 34, nos. 75, 80–83.)

Casa 75. Eight-roomed house north of Winslow road between Doney park and Gourd Flat. This is the center of a group of one-roomed houses. There was a wall extending toward the north. This house is relatively well preserved and had been built of stone. Some one had tried excavating one of the southern rooms. The pottery was black and white and much red and black.

Casa 80. On a spur of lava, west of Casa 75 and north of the road is a two-roomed house, rooms both 12 × 15. There is a depressed area to the west. Black and white decorated potsherds

Casa 81. 33 feet south of Casa 75. One-roomed—9 × 9 feet.

Casa 82. 33 feet south of Casa 81. One-roomed—6 × 9 feet.

Casa 83. 33 feet east of Casa 75. One-roomed—9 × 12 feet.

(5) Gourd Flat Group

Gourd flat is dominated by New Cave mountain which rises to the north through a series of lava terraces to the cinder and lava cone of the peak 500 feet above the level of the flat.

This district at present is without surface water. The nearest permanent supply is Turkey tank four miles east. The next nearest is the Spring 141 at the foot of Elden mountain six and a half miles west. It is possible to cultivate the lower terraces on the lava flows and also Gourd flat, while it may be possible to grow Hopi corn among the cinder cones to the north.

Artificial tanks in the Rio de Flag if they were not frequently washed out by cloud bursts would hold some water. It would form a very precarious supply at the best. At present there are a few wells in Doney park but most of the ranchers in this region haul their water, some from Turkey tank, others from the wells in Doney park and some even from Flagstaff. In certain seasons all water has failed so all have either to go to Flagstaff or buy water from the railroad.

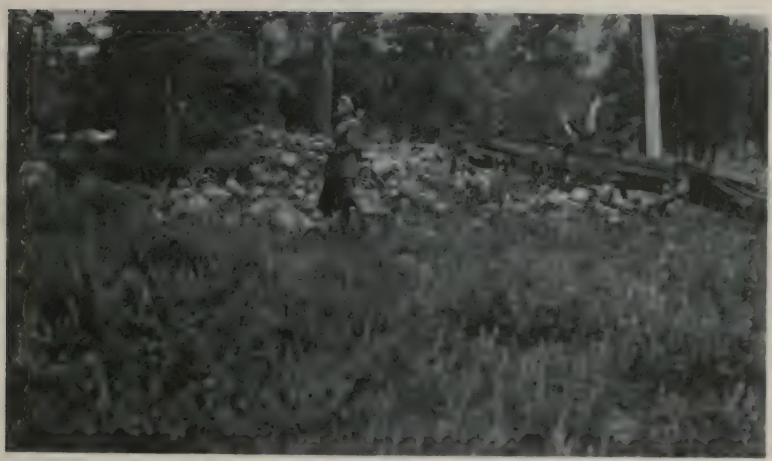
On the terraces on the north side of the flat are a number of house groups while the greatest group is that of the New Cave Mountain Pueblo which covers the upper part of the cinder cone and which includes the caves described by Fewkes (1897). The present authors did not make a careful survey of this interesting region but they noted a number of things that were not reported by Fewkes.

As is well known the peak of the hill is crowned by a fort with very thick walls, 2 to 4 feet thick. On the north end of the fort the walls include a few dwelling-houses (Casa 7) in which for houses having walls of irregular blocks of lava they are very well preserved. Below the wall to the north are a number of house ruins.

Below the fort to the south are groups of buildings of from two to six rooms. These rooms are notable for their large size and also for the fact that each one has a cellar smaller than the room itself hollowed out of the lava and ash which reminds one of conditions found in the Old Cave Hill Group described by Fewkes. Among these ruins are the foundations of other older houses which had been robbed to build the newer ones. This might or might not indicate more than one occupation of the pueblo. Black and white as well as two shades of red and black decorated potsherds were found.

In a saddle between the two peaks is a leveled off plaza referred

VIEW OF PART OF PUEBLO 142



VIEW OF PART OF PUEBLO 124

to by Fewkes as a reservoir. Beside this is a large building of a single room, 30 × 36, which with its relation to the plaza suggests a ceremonial chamber of some sort. A similar room was seen by the writers at the pueblo above Montezuma's well in the Beaver valley.

As described by Fewkes this mountain is the rim of a crater of a volcano. In the bottom of the crater is a plutonic plug of tumbled blocks of grayish lava. In this there are a number of small house ruins. On the floor of the crater is a large inclosure indicated by a line of stones and now filled with drifting sand. There are strong indications that this formed the reservoir from which the inhabitants of the pueblo above procured their water, as a distinct trail thickly strewn with pottery fragments leads downward from the plaza to the edge of the inclosure. This seems to show that the water supply, at least in certain times in the year, was not nearly so far away as one would imagine. Gourd flat is four hundred feet below the plaza or five hundred feet below the fort. The reservoir in the crater, on the other hand, is but two hundred feet below the plaza and three hundred below the fort.

This New Cave pueblo would be well worth a careful study as it combines in many ways the pueblo and the small house.

On the lava terraces below New Cave mountain are a number of house groups. These are figured in fig. 34.

Casa 16. Located on the flank of New Cave mountain was a house of eight rooms of which was the center a number of other houses. This had relatively small rooms, 9 × 9. Many of the rooms of the houses in this group had had cellars like the ones described above. (Fig. 34, no. 16.)

Casa 15. Directly to the west of 16 were the foundations of an old house, the building material of which had evidently been taken to build the others in the group.

Casa 14. Further to the west was another house which had had a cellar.

Casa 13. Still further west was but an outline. This was probably an older house the material of which had been robbed to build Casa 14 or Casa 16.

Casa 17. One-roomed house, 12 × 13 feet.

Casa 18. One-roomed house, 12 × 12 feet.

Casa 19A. A three-roomed house—rooms 12 × 12, 9 × 12, 9 × 12.

Casa 19B. Faint traces of a house to the west of 19A.

Casa 19C. Faint trace of a house to the east of 19A..

Casa 20. Just to the west of Casa 16 on a lava flow 50 feet lower is a two-roomed house with a circular row of stones to the east of it. This is the only place in the whole region where a circular ruin is indicated. It suggests that here we might have an estafa such as are found in the San Juan region. The circular row of stones appears older than the house beside it. On the other hand it might be what is left of a Navajo hogan of much later date. The house has two rooms, one 12 × 12, the other irregular 12 × 9. The larger room had a cellar like those in the pueblo above.

Casa 84. On the lower terrace overlooking Gourd flat. There was a four-roomed house. Three of the rooms surrounded by extremely thick walls 2½ to 3 feet thick. These rooms are 9 × 12, 12 × 15 and 9 × 12. To the south is an irregular room with thin walls 18 × 12. Black and white decorated potsherds found.

Casa 85. North of Casa 84. One room, 9 × 12. Has had a cellar.

Casa 86. Twelve feet north of 85. One room, 9 × 9.

Casa 87. A mound SE of Casa 84.

These are only a few of the houses in this neighborhood. Several others lay within a hundred yards of Casa 84.

(6) Fortress Hills Group

The houses of this group are scattered over an area three miles wide and four miles long, having as a center a fort on one of a group of unnamed hills three miles southwest of Turkey tanks, which we have called Fortress hills. (Fig. 28.)

Arable land may have been in the cedars west of the hills or between the hills and Walnut creek. Water may be procured at certain seasons from three sources, by digging in the sandy bed of Walnut creek a mile and a half east, from Turkey tanks three miles northeast or from the lower end of Walnut canyon two and a half miles south. In dry seasons all of these sources but the last mentioned will go dry.

Fort 52. Township 21N–R9E, Section 5. This fort is located on a lava cap on the central peak of Fortress hills. It is sheer twenty or thirty feet on all sides but there is a talus at some points which allows access to the top. All places that can be scaled are defended by walls, 2 to 3 feet thick, as is shown on Fig. 35, no. 52 and pl. XI. A trail in a crevice on the southeastern end allows one to approach the top. Although the evidence is quite strong that the fort belongs to the era of the small house ruins associated with it, yet there is a chance that Apaches may have constructed the walls out of earlier ruins—a relation found by Hough at Forestdale. These ruins are as follows.

TOP OF FORTRESS MOUNTAIN SHOWING LAVA FLOW ON WHICH IS LOCATED THE FORT

ONE OF THE WALLS OF THE FORT

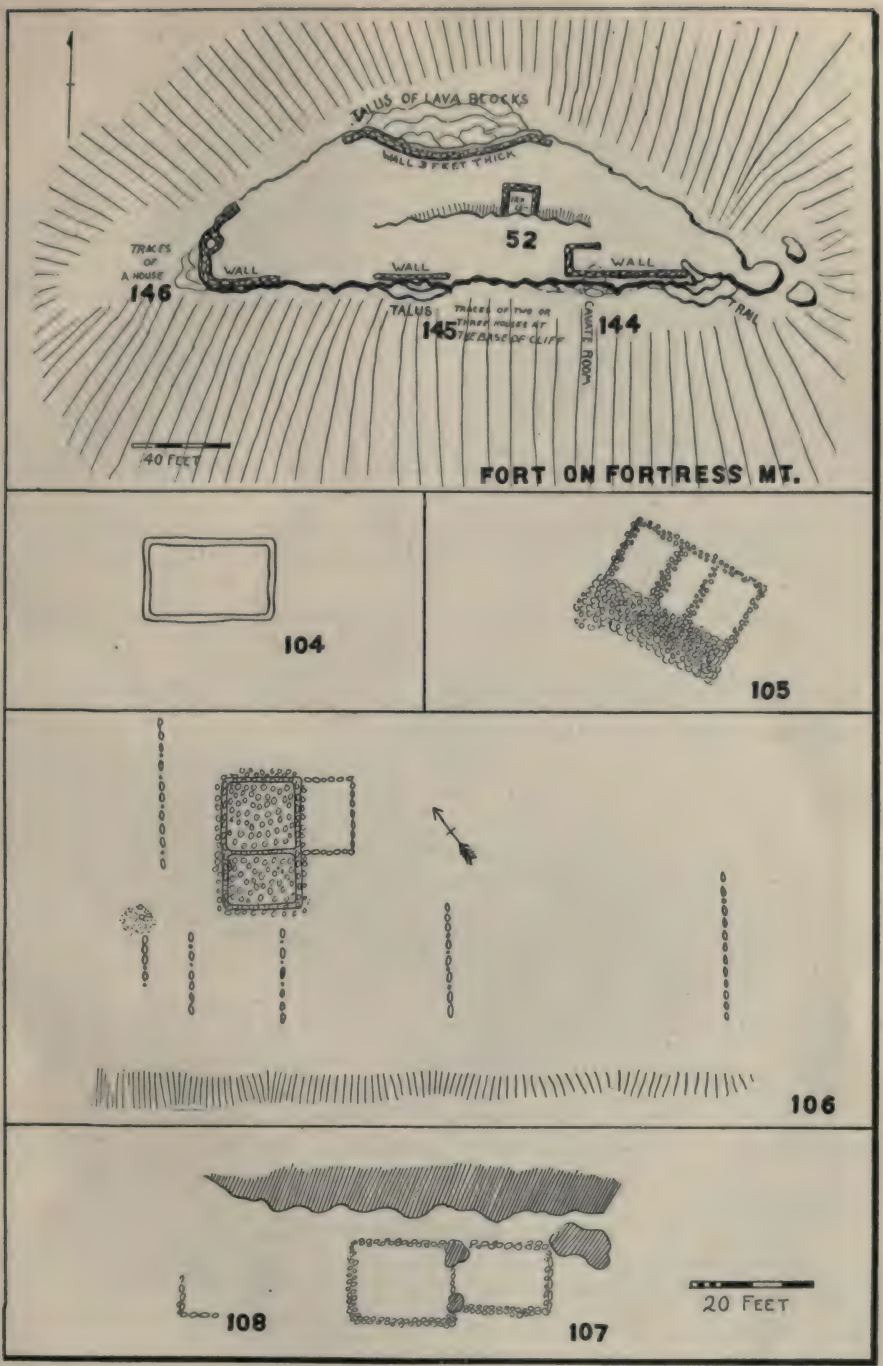


FIG. 35.—No. 52 is the fort on Fortress hill. Nos. 104, 105, 106, 107, 108, etc., are small houses near by.

Casa 52A. A house partly made by the southeast wall.

Casa 52B. A house located in the center of the fort, one side of which is made by a little cliff. Size 12 × 15 feet.

Casa 52C. A small round tower at the lower or westernmost end of the fort. The inside diameter of this is scarcely 3 feet, not large enough to shelter one man.

Casas 51A and 51B. Two small houses on the shoulder of the north peak.

Station 53A. Area of abundant sherds in the notch between the central and the south peak.

Station 54B. An area of abundant sherds in the valley between the same peaks just west of 53. It is possible that the sherds found at 53 and 54 were really from some houses that were tucked away under the south side of the lava cap above. Large fragments of black and white pottery are very abundant.

Casa 144. Is a cavite room on the south side of the Fortress mesa near the trail to the top.

Casa 145. Faint traces of one or more houses at the base of the cliff.

Casa 146. Traces of a house among the boulders at the west end of the Mesa.

Casa 148. Traces of a house among the boulders of a very recent lava flow north of the Carlos ranch, Sec. 34, Township 22N–R9E.

Casa 119. On an eastern shelf of Fortress facing Crater hill.

Casas 109 and 110. On a little mesa east of school house are two areas of numerous sherds. No distinct ruins present.

Casa 104. Sec. 17, south of railroad and south of Walnut canyon—Winona road. Single-roomed house 12 × 20. Red and black, black and white potsherds found. (Fig. 35, no. 104.)

Casa 105. Sec. 16, south of the Walnut canyon.—Winona road on a terrace overlooking an arroya in a shallow canyon is a house of probably six rooms. Three rooms are distinct, 9 × 12, 6 × 12, 9 × 12. The other rooms are covered by debris. Black and white decorated potsherds found. (Fig. 35, no. 105.)

Casa 106. Sec. 15. In Walnut canyon on a terrace overlooking the dry Walnut creek. It is of three rooms, 9 × 12, 12 × 12, 9 × 12. It is particularly interesting on account of numerous parallel walls on the terrace. At right angles to the axis of the Canyon, black and white decorated pottery found (Fig. 35, no. 106.)

Casa 107. Sec. 15. At the base of the cliff where Walnut canyon makes its first bend is a small house ruin of two rooms, 12 × 61 and 11 × 16. This house stood about four feet out from the cliff which is notable in that it is not against the cliff.

Casa 108. Is just a few feet west of 107. It is an older house, the building material from which probably went to construct 107. Black and white and red and black decorated potsherds. (Fig. 35, no. 108.)

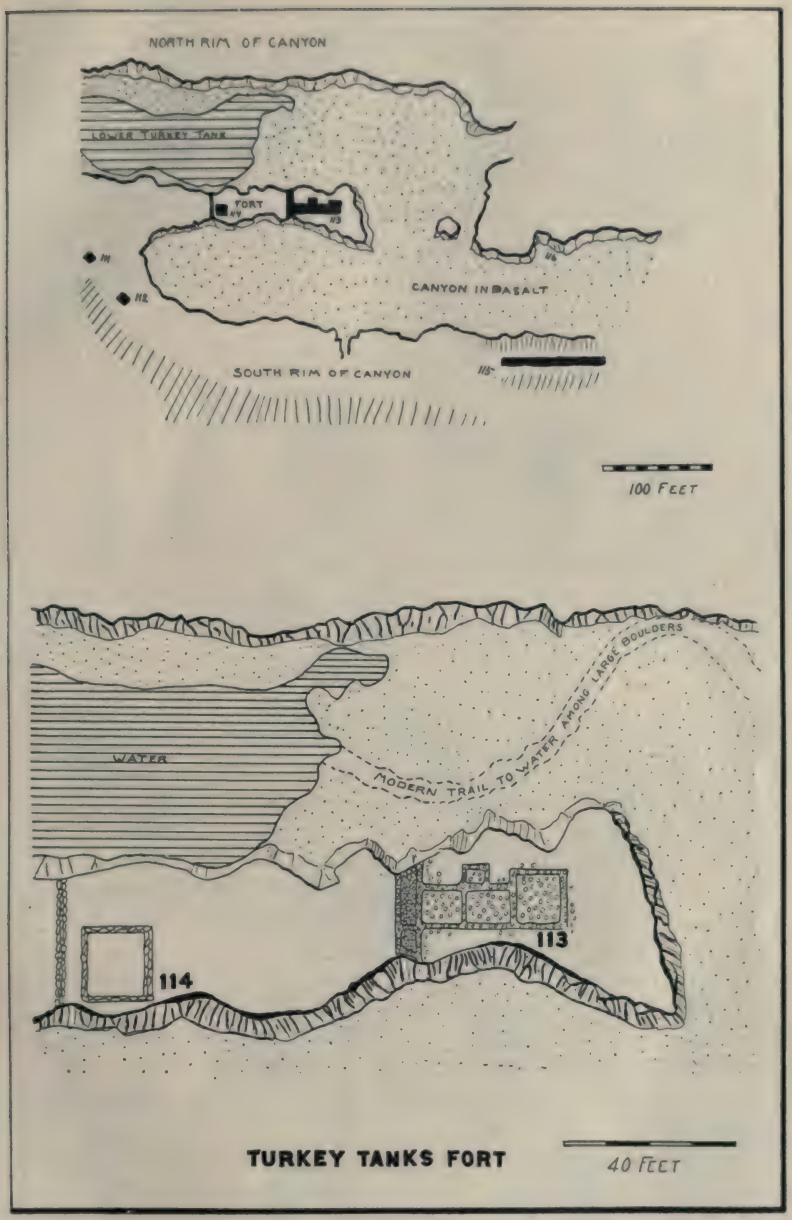


FIG. 36.—Map of the fort at Turkey tanks. Below is a plan of the houses within the fort.

Turkey Tank Group

(Township 22N–R9E, Sec. 25, 26, 36)

The permanent natural reservoirs known as Turkey tanks form a center for a group of ruins the best known and best preserved of which are the Turkey Tank caves (117). As these have been described by Fewkes, no mention will be made of them here except to add that indications of a wall can be traced across part of the flood plain of the stream below the cave pueblo. As there is no permanent water supply at present in the pool below the pueblo this might suggest part of a dam. However, there are many reasons why this is not so but it would be inadvisable to discuss them here. Black and white sherds are abundant.

Fort 113. Fig. 36. Turkey tanks are pools in the bottom of a canyon cut by Walnut creek through a lava flow. This canyon is thirty or forty feet deep. Near the lower pool there is a peninsula, a little over a hundred feet long, jutting out into the canyon. In the widest place it is less than fifty feet, in the narrowest about thirty. The walls of the canyon at this point are precipitous from fifteen to thirty feet high. Across this neck of land are two walls; an ancient outer wall and an inner more recent one. Of the ancient wall nothing remains but the foundations. The recent wall is still five or more feet high, fallen stones indicating that it was once much higher. Within this wall is a building apparently of three main rooms with traces of three smaller rooms (see plan).

Casa 114. This is an ancient one-roomed house the material of which has gone to build Casa 113.

Casas 113 and 114 together form a fort unique as forts of this region go, because water could be procured by lowering an olla over the edge of the cliff without leaving the shelter of the outer wall. Black and white potsherds were abundant below the fort.

Casas 111 and 112, south of Turkey tank and west of the fort, are small one-roomed houses of which the foundations alone remain.

Casa 115. Is a house of many rooms in a row facing the canyon southeast of the fort. They are much ruined and hard to make out.

Station 116. There are pictographs on the north side of the canyon opposite Casa 115.

Casa 118. One-roomed house on hillside, one-half mile NE. of Turkey tanks. Not measured.

Pottery

The potsherds (fig. 37) collected from the various sites in this region are fragments of ollas, bowls, dippers, and corrugated cook-

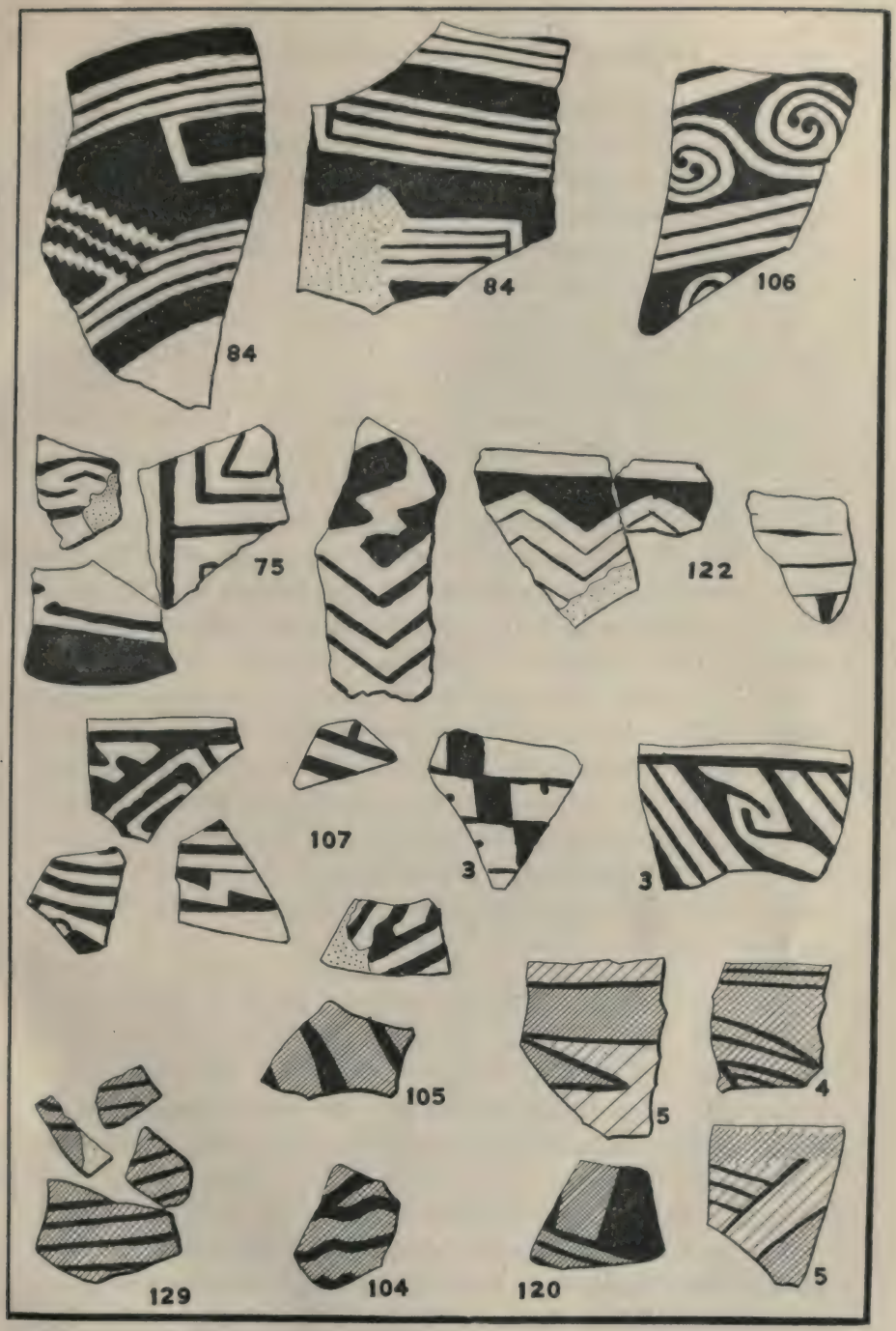


FIG. 37.—Potsherds. Those that are cross hatched are red.

ing jars, all characteristic of the pueblo culture. Of decorated pottery but two kinds have been found in this region. The most abundant is a fine grained white ware with geometrical designs in black. With this on some sites is associated a red ware with similar designs. No characteristic Hopi potsherds were collected in this district, nor any with obviously symbolic designs.

With the small house ruins various authors have associated but one kind of decorated pottery other than the corrugated ware; the fine-grained white ware with the geometrical designs in black. Nelson (1916) in the Galisteo basin of New Mexico has shown that this type of pottery is the most ancient type of decorated pottery, it being the only type found at the bottom of certain ancient refuse heaps. Many of the small house ruins in this region have associated with the characteristic black and white pottery, red with black decorations. In the Elden Spring region the few sherds of decorated red ware found are ornamented with rather fine black lines. To the east among the better preserved ruins at New Cave mountain the red decorated pottery is more abundant, the design more complicated often employing two shades of red. This was characteristic of but one site in the Elden Spring district, Casa 25. A careful study based on far larger collections of potsherds from each site might allow some conclusions to be drawn. With the small collections on hand it would be unsafe to attempt to use potsherds as a basis for the comparison of one house with another.

Trails

Two fairly distinct trails blazed by fragments of broken ollas were traced, one from Elden springs to Pueblo 124 and the other about a third of the way between Elden spring and Pueblo 142. It was a very clear trail and could have been traced much farther. No doubt other trails of this type could be discovered.

Occupation

It is probable that a number of these houses served as summer shelters only, therefore we have little reason to believe that they were all occupied at the same time. It is well known that the

Indian, not using fertilizer on his cornfields, is obliged to allow his fields to remain fallow following a number of years of cultivation. The result of this would be an abandoned shelter. After some years the ruined shelter might be rebuilt perhaps by a different individual or a new site near by might be selected.

In this region there are indications of two periods of general occupation. One which is represented by the faint pueblo at Elden spring (60) as well as most of the detached houses thereabout, by the fort on Fortress mountain and by the houses 111, 112, 115, at Turkey tank and perhaps the houses on the rim of Walnut canyon.

The latter occupation of the country is represented in the Elden district possibly by Pueblo 124. In the eastern district this later period of occupation is represented by Pueblo 142, the pueblo on Old Caves hill (72), by the pueblo on New Cave mountain, as well as the small house groups about Gourd flat, the Pueblo at the Turkey Tank caves, Casa 113 in the Turkey Tank fort and the cliff houses in Walnut canyon. This age relation is correlated with three other factors; in the earlier period the houses had larger rooms, used little stone in their construction and in general did not consider defense in choosing a site. Only excavations will prove if this hypothesis is correct.

A number of other questions can be solved by excavating. Only by such means can it be possible to separate the summer shelters from the permanent residences. The burial places are unknown. As this country is rapidly being fenced in and large portions taken up for agriculture it is important that a serious study of this region be soon undertaken; otherwise, it may be too late.

Summary

In the summer of 1916, in the neighborhood of Flagstaff, Arizona, the authors discovered a number of ancient dwelling sites and ruins not previously described by archaeologists working in the region. They consisted of various types, as follows: camp sites of wandering hunters, summer shelters occupied by Pueblo Indians,—tending their corn fields, small houses of permanent residence, pueblos or villages and forts.

In many of the ruins underground chambers formed an interesting feature. While deep depressions were found upon most of the sites, no positive evidence could be had of the existence of kivas or estufas. A circular line of stones, discovered in one instance, may have represented the remains of a Navajo hogan or Apache shelter of much later date. Although many were grouped about springs and tanks, others were as much as five miles from a permanent water supply. There were indications of at least two successive occupations of the country. A systematic study of these ruins would lead to interesting results.

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